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**Assessment for learning in Design and Technology:  
An ethnographic study in Mauritius state secondary  
schools**

A thesis  
submitted in fulfilment  
of the requirements for the degree  
of

**Doctor of Philosophy**

at  
**The University of Waikato**

by  
**Chandan Boodhoo**



THE UNIVERSITY OF  
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## **ABSTRACT**

Research advocates that it is the teacher's role to support learners to take the next steps in their learning. 'Assessment for learning', considered as a bridge between teaching and learning, not only provides teachers with multiple possibilities to enhance students' learning, but can also transform their own practice. Despite research interest in educational assessment, teachers' 'assessment for learning' behaviours and perceptions are under-researched. This study investigated Design and Technology teachers' 'assessment for learning' practices in state secondary schools in Mauritius since little is known about this context. A constructivist epistemology, naturalistic interpretative perspective and an ethnographic methodology was used to understand the participants' 'assessment for learning' practices in their natural settings. The study was underpinned by sociocultural theory, Foucault's and Bourdieu's critical theories, and Bronfenbrenner's ecological model as theoretical frameworks. A three-stage mixed methods research design was adopted, which involved multiple methods of data collection, including questionnaires, interviews and observations along with field notes and secondary documents. The participants involved were 29 Design and Technology teachers and 16 students (14-year-olds) from schools of three educational zones. The results of this study indicate that Design and Technology teachers did not enact 'assessment for learning' strategies to enhance their teaching and student learning. Despite the introduction of a new curriculum and the policy initiatives of the Mauritius Ministry of Education to adopt learner-centred approaches to assessment, Design and Technology teachers focused on syllabus coverage, using traditional assessment approaches and teaching students to sit for end-of-year examinations. The findings of this study have important implications for policymakers, teacher educators, principals and Design and Technology teachers. Key implications associated with 'assessment for learning' include the need to develop: teacher education programmes that cover concepts and theories, and evidence of best practice; and professional learning and development programmes that complement the national curriculum, and explore the relationships between beliefs and practices and influences of contextual factors.



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*I love you.*





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# TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>i</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>iii</b>
<b>PUBLICATIONS ARISING FROM THIS THESIS .....</b>	<b>vii</b>
<b>TABLE OF CONTENTS.....</b>	<b>ix</b>
<b>LIST OF FIGURES.....</b>	<b>xv</b>
<b>LIST OF TABLES .....</b>	<b>xvii</b>
<b>LIST OF ACRONYMS .....</b>	<b>xix</b>
<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 Importance of Assessment .....	3
1.2 Personal Rationale for this Study.....	5
1.3 Overview of this Thesis .....	9
Summary .....	10
<b>2. LITERATURE REVIEW .....</b>	<b>11</b>
2.1 Assessment in Education .....	12
2.1.1 Purposes of assessment .....	12
2.1.2 Formative assessment .....	14
2.1.3 Summative assessment.....	16
2.1.4 Evaluative purpose.....	19
2.1.5 Issues in educational assessment.....	21
2.1.6 Assessment for, as and of learning.....	28
2.1.7 Assessment literacy.....	33
2.1.8 Assessment in Technology Education .....	37
2.2 Theoretical Underpinnings.....	44
2.2.1 Instructivism and constructivism .....	44
2.2.2 Constructivism and social constructivism.....	49
2.2.3 Theoretical explanations for the influence of context.....	56
Summary .....	70
<b>3. THE CONTEXT .....</b>	<b>71</b>
3.1 Context of Assessment in the Republic of Mauritius .....	72
3.1.1 Mauritius culture.....	72
3.1.2 Major reforms of the education system.....	73
3.1.3 Research studies conducted in the Republic of Mauritius .....	98
3.2 Research Questions.....	101

Summary .....	103
<b>4. METHODOLOGY .....</b>	<b>105</b>
4.1 The Research Process.....	106
4.2 Philosophical Perspectives .....	106
4.2.1 Ontology.....	106
4.2.2 Epistemology.....	107
4.2.3 Theoretical perspectives .....	109
4.3 Ethnographic Methodology.....	111
4.3.1 The insider perspective.....	112
4.4 The Research Continuum .....	114
4.4.1 Mixed methods .....	115
4.5 Methods.....	118
4.5.1 Questionnaire .....	118
4.5.2 Interview .....	119
4.5.3 Observation .....	122
4.5.4 Secondary data .....	125
4.5.5 Sampling procedures .....	125
4.5.6 Data collection procedure.....	128
4.6 Data Analysis .....	137
4.7 Ethical Considerations .....	139
4.8 Maintaining Trustworthiness .....	141
Summary .....	143
<b>5. TEACHER INTERVIEWS .....</b>	<b>145</b>
5.1 Preparing Students for Examinations.....	146
5.1.1 Regular tests .....	148
5.1.2 Use of past examination questions .....	150
5.1.3 Documents used as guidelines.....	151
5.2 Completing Administrative Duties .....	156
5.2.1 Daily assessment .....	157
5.2.2 Formal assessment.....	157
5.2.3 Documenting information .....	159
5.2.4 Evidence for administration .....	160
5.3 Refining Teachers' Practices.....	161
5.3.1 Checking teaching effectiveness .....	162
5.3.2 Improving teaching decisions.....	162
5.3.3 Transforming teaching practice.....	163

5.3.4 Planning future lessons .....	165
5.4 Enhancing Students' Learning.....	166
5.4.1 Learning intentions and success criteria .....	166
5.4.2 Classroom discussion and learning tasks .....	168
5.4.3 Medium of feedback .....	170
5.4.4 Self-assessment, peer learning and group work.....	173
Summary .....	174
<b>6. TEACHERS' PRACTICES IN THE CLASSROOM .....</b>	<b>175</b>
6.1 Clarifying and Sharing Learning Intentions and Success Criteria.....	177
6.1.1 Learning intentions .....	178
6.1.2 Success Criteria.....	181
6.2 Developing Classroom Discussions and Learning Tasks that Elicit Evidence of Students' Learning .....	184
6.2.1 Activities to obtain evidence of students' learning.....	184
6.2.2 Discussions and questioning strategies .....	187
6.3 Providing Feedback to Learners .....	190
6.3.1 Individualised verbal feedback on students' work.....	190
6.3.2 Individualised written feedback on students' work .....	191
6.3.3 Feedback on test activities .....	195
6.3.4 Feedback to motivate students .....	199
6.4 Promoting Learner Autonomy .....	200
6.4.1 Collaboration.....	200
6.4.2 Self-assessment .....	202
6.4.3 Peer-assessment .....	202
6.5 Teachers Reviewing and Reflecting on Assessment Information .....	203
6.5.1 Collecting and recording evidence of students' learning .....	203
6.5.2 Informing practice.....	205
6.5.3 Reflection to transform practice.....	207
Summary .....	208
<b>7. STUDENT INTERVIEWS .....</b>	<b>211</b>
7.1 Interpretations of Assessment .....	212
7.2 Opinions on 'Assessment for Learning' .....	213
7.3 Students' Opinions on, and Implementation of, Feedback .....	216
7.4 Views on Learner Autonomy.....	217
Summary .....	220
<b>8. DISCUSSION .....</b>	<b>223</b>

8.1 D&T Teachers’ ‘Assessment for Learning’ Practices.....	225
8.1.1 Clarifying and sharing intentions and criteria .....	225
8.1.2 Supporting discussions .....	229
8.1.3 Feedback to students .....	231
8.1.4 Activating learner autonomy .....	233
8.1.5 Improving their practice .....	237
8.2 Guidelines used to implement ‘Assessment for Learning’ .....	239
8.2.1 Syllabus and textbooks.....	239
8.2.2 Curriculum framework.....	241
8.2.3 Cambridge International Examinations documents .....	243
8.2.4 School policy.....	244
8.2.5 Experiences and knowledge .....	245
8.3 Rationales for Implementing ‘Assessment for Learning’ .....	246
8.3.1 Accountability .....	247
8.3.2 Improve practice.....	249
8.3.3 Enhance students’ learning.....	251
8.3.4 Prepare students for examinations.....	253
8.4 Students’ Conceptions of ‘Assessment for Learning’ .....	255
8.4.1 Understanding of the terms assessment and ‘assessment for learning’ .....	255
8.4.2 Conceptions of feedback .....	257
8.4.3 Conceptions of collaboration .....	259
8.4.4 Conceptions of self- and peer-assessment.....	260
8.5 The Overarching Research Question .....	262
Summary .....	269
<b>9. CONCLUSION.....</b>	<b>271</b>
9.1 Conclusions.....	272
9.2 Implications for Education .....	274
9.3 Strengths and Limitations of the Research Design .....	277
9.4 Recommendations for Further Research.....	278
9.5 Concluding Comment .....	280
<b>REFERENCES .....</b>	<b>281</b>
<b>APPENDICES.....</b>	<b>329</b>
Appendix A: Educational Zones of the Republic of Mauritius.....	329
Appendix B: Structure of Education as from 2011 .....	330

Appendix C: Structure of Education: Nine-year continuous basic education as from 2017 .....	331
Appendix D: Questionnaire .....	332
Appendix E: Teacher Interviews Questions .....	334
Appendix F: Student Interviews Questions .....	335
Appendix G: Observation Sheet .....	336
Appendix H: Observation Rubrics .....	337
Appendix I: Letter to Ministry of Education and Human Resources, Tertiary Education and Scientific Research. ....	347
Appendix J: Access by Ministry of Education .....	349
Appendix K: Letter to Principals .....	350
Appendix L: Letter to Teachers .....	353
Appendix M: Letter Head of Department at Mayfield .....	356
Appendix N: Available Teachers for Interviews and Teacher Selection for Observations .....	357
Appendix O: Letter to Form 3 Students.....	358
Appendix P: Letter to Parents .....	361
Appendix Q: Transcript Release Form .....	364
Appendix R: Ethics Approval .....	365
Appendix S: Codes Used in the Study .....	366





## LIST OF FIGURES

Figure 1.1. Islands of the Republic of Mauritius .....	6
Figure 4.1 The research design .....	105
Figure 4.2 The data collection methods using mixed methods embedded within qualitative research.....	118
Figure 4.3 Planned stages, methods, and samples for the study .....	127
Figure 4.4 Data collected by stages, methods, and samples .....	129
Figure 6.1 Reed's weekly plan without learning intentions (SD.T2.L4.P5).....	179
Figure 6.2 Bronn's first weekly plan two after he completed his lesson (SD.T3.L8.P.15) .....	180
Figure 6.3 Renly's learning objective for lesson one (SD.T4.L4.P.12).....	180
Figure 6.4 Renly's learning objective for lesson three ( SD.T4.L4.P18).....	181
Figure 6.5 Renly's marking scheme used to allocate marks for an activity (SD.T4.L8.P6) .....	183
Figure 6.6 An example of a student's answer corrected by Renly where the marking criteria were not shared with the students (SD.T4.L9.P31).....	183
Figure 6.7 An example of an examination question Reed set as classwork for which marks were given (SD.T2.L9.P1) .....	185
Figure 6.8 A draft of the set of questions Bronn developed to collect evidence of students' learning (SD.T3.L11.P2).....	187
Figure 6.9 An example of Renly's comments when verifying students' completed work at his desk (SD.T4.L6.P4) .....	192
Figure 6.10 An example of Bronn's comment when verifying students' completed work at his desk (SD.T3.L9.P40) .....	192
Figure 6.11 An example of Reed's recording (scores) that allowed him to identify if students' completed works were checked (SD.T2.L1.P1).....	193
Figure 6.12 A sample of Reed's feedback (indicated by the arrows) after checking a student's completed work at his desk (SD.T2.L11.P15) .....	194
Figure 6.13 A sample of Renly's comments and score after checking a student's completed work at his desk (SD.T4.L9.P.26).....	195
Figure 6.14 A sample of Renly's feedback on one test activity (SD.T4.L9.P2).....	196
Figure 6.15 A sample of Bronn's feedback on test activities (SD.T3.L11.P14).....	196
Figure 6.16 A sample of Bronn's remark regarding students' difficulties (SD.T3.L8.P14) .....	204
Figure 6.17 An example of Renly's planner used for recording students' activities that he verified (SD.T4.L8.P2) .....	205

Figure 6.18 An example of weaknesses identified when conducting ‘assessment for learning’ to which teachers paid little attention and did not adjust their teaching; ‘constructing of outlines and faint lines’ (SD.T4.L6.P24) .....	206
Figure 6.19 Two examples of the same weaknesses (accuracy and neatness) identified when conducting ‘assessment for learning’ that all students struggled with, but the teachers paid little attention and did not adjust their practices to remedy the situation (SD.T3.L9.P43; SD.T3.L9.P29).....	207
Figure 8.1 Internal and external factors that could possibly influence teachers’ ‘assessment for learning’ practices to enact effective ‘assessment for learning’ practices.....	264
Figure 8.2 Internal and external factors that potentially shape D&T teachers’ ‘assessment for learning’ practices in Mauritius .....	266
Figure 9.1 The fundamentals that could improve teachers’ ‘assessment for learning’ beliefs and practices.....	276

## LIST OF TABLES

Table 2.1 Educational Assessment Setting and Three Main Purposes .....	13
Table 2.2 Elements of Instructivism and Constructivism .....	45
Table 3.1 Mauritius Education System (Mainstream) .....	74
Table 3.2 Number of Primary and Secondary Schools in Mauritius and Rodrigues in 2014.....	77
Table 3.3 Primary and Secondary Education Structure of the Towards a Quality Curriculum: A strategy for reform and Nine-Year Continuous Basic Education.....	79
Table 3.4 Number of Secondary Mainstream Teachers Categorised by the Highest Academic Qualification and Absence of Professional Qualification in 2016.....	92
Table 3.5 Highest Professional Qualification of Secondary School Mainstream Teachers in 2016.....	92
Table 4.1 The Number of D&T Teachers Agreeing to Participate, by Schools .....	131
Table 4.2 The Number of Teacher Interviews by Types .....	133
Table 4.3 Five Criteria Used to Eliminate Unsuitable Teacher Participants .....	134



## LIST OF ACRONYMS

Acronyms	Long form
ARG	Assessment Reform Group
CPE	Certificate of Primary Education
D&T	Design and Technology
HSC	Higher School Certificate
ICT	Information and Communication Technology
MOE	Ministry of Education
MOECHR	Ministry of Education, Culture and Human Resources
MOEHR	Ministry of Education and Human Resources
MOEHRTESR	Ministry of Education and Human Resources, and Tertiary Education and Scientific Research
MOESR	Ministry of Education and Scientific Research
MOFED	Ministry of Finance and Economic Development
NCF	National Curriculum Framework
NCFS	National Curriculum Framework: Secondary
SC	School Certificate
TQC	Towards a quality curriculum: A strategy for reform
UNESCO	United Nations Educational, Scientific and Cultural Organisation



# CHAPTER ONE

---

## INTRODUCTION

Assessment significantly influences what students learn, how they learn, how much they learn and how effectively they learn (Jimaa, 2011). For genuine learning to occur, assessment needs to be effective. Research shows that effective assessment is essential to enhance students' learning. Effective assessment is complex and dynamic (Harlen & Gardner, 2010), and its effectiveness relies on teachers' knowledge and understanding of principles and practices and skills to use these in practice (Edwards, 2013).

Harlen (2010) listed 10 principles of effective assessment practices derived from experts in education assessment, including effective assessment enhances students' learning, enables them to show what they can do and fosters learners to be actively engaged in their learning as well as in assessment. Effective assessment is part of the teaching process, one that fits the purpose and facilitates growth towards the key learning goals. Harlen also states that the assessment methods should satisfy standards that show a broad consensus on quality at various levels (from classroom practice to national policy).

In a subject like Design and Technology (D&T), there is an added complexity when implementing effective assessment. This complexity concerns the multidimensional nature of technological activities involving procedural, conceptual, technical and societal aspects (Hope, 2009; Moreland, Cowie, & Jones, 2007; Stevenson, 2004). Thus, D&T teachers require the skills to apply assessment in a range of aspects within their classrooms. Long-term tasks in D&T make assessment more challenging whereby teachers are expected to continuously interact and converse with their students during learning, and support them throughout with detailed feedback about the next steps of their learning (McLaren, 2012; Moreland et al., 2007).



In the Republic of Mauritius, assessment is considered an integral part of the curriculum (Ministry of Education and Human Resources [MOEHR], 2006). Teaching, learning and assessment are perceived to be inextricably linked and teachers are expected to implement both formative and summative assessments (MOEHR, 2006, 2009). However, a review of education in the Republic of Mauritius indicated that a few assessment purposes dominated teachers' assessment practices in schools (Chumun, 2002; M. Griffiths, 1998; Sukon, 2011a). For example, the focus was on preparing students for examinations that led to certification and selection. Central to certification was the belief that performance standards and competition would improve students' achievement and at the same time hold the school accountable (Fenwick, 2017; Ponzio, 2011; Whetton, 2009).

Several countries (such as England and Scotland) have reviewed their curriculum and set new standards in schooling through high-stakes testing systems (Fenwick, 2017; Hayward, 2015; Hopmann, 2008; Linn, 2008; Whetton, 2009). The Republic of Mauritius has also followed the trend with curriculum reforms and high-stakes testing systems (MOEHR, 2006; Ministry of Education and Human Resources, and Tertiary Education and Scientific Research [MOEHR/TER], 2016). Several studies in the Republic of Mauritius indicate that the focus on high-stakes testing has led to a highly competitive and examination-oriented education system (Auleear Owoodally, 2007; Dindyal & Besoondyal, 2007; Education Support Program, 2006; Foondun, 1992; M. Griffiths, 2000).

The education system in the Republic of Mauritius is considered to be highly competitive for several reasons (Ah-Teck & Starr, 2013; Dindyal & Besoondyal, 2007; Foondun, 1992). First, high-stakes examinations at the end of primary schooling allow students to access a prestigious secondary school, referred to as 'a national school'. Second, individuals use the secondary school external examinations results, also known as School Certificate (SC) and Higher School Certificate (HSC), for gaining employment positions. Third, excellent SC and HSC examination results allow students to compete for local and international tertiary scholarships. Fourth, good SC and HSC examination results also enable students to contest for a seat at one of the few local tertiary institutions. For all these reasons, the focus on academic outcomes from high-stakes examinations exert intense

pressure on the students, parents, teachers and principals of both the primary and secondary schools in the Republic of Mauritius.

This chapter presents an outline of this thesis. The introductory part briefly explains the meaning of effective assessment and emphasises several assessment issues surrounding high-stakes examinations in the Republic of Mauritius. After the general introduction, this chapter is sub-divided into three main sections. The first section describes the importance of assessment in education. The second section explains the personal rationale leading to my interest in researching ‘assessment for learning’ in D&T. Since ‘assessment for learning’ is the focus of this research, this section also explains the reason for my interest in the particular field. The third section presents a concise description of the structure of the thesis.

## **1.1 Importance of Assessment**

Assessment is considered to be a “bridge between teaching and learning” (Wiliam, 2013, p. 15). For assessment to function as a bridge, teachers need to understand the principles of assessment. For example, teachers need to collect and interpret assessment information and provide feedback to students. When collecting and interpreting assessment information, it should be for some purpose (Harlen, 2007) and, according to the literature, the central purpose is to monitor learners’ progress towards goals (Andrade, 2013). To monitor learners’ progress towards goals, the collection of evidence needs to be a “formal attempt” (Popham, 2014, p. 8), meaning that teachers need to deliberately collect information in systematic ways using diverse kinds of measurements. For example, teachers should not solely rely on tests or judge students based on their opinions.

The process of assessment also involves providing feedback to students “to deepen their learning and improve their performance” (Andrade, 2013, p. 24). With the goal of deepening learning and improving performance, assessment feedback should be “formulated, delivered and framed in such a way that it invites learners’ active engagement with the feedback” (Havnes, Smith, Dysthe, & Ludvigsen, 2012, p. 21).

However, not all assessment types have the same purposes. The literature acknowledges three distinct but crucial intertwined assessment types: ‘assessment of learning’, ‘assessment for learning’, and ‘assessment as learning’ (L. Earl, 2013; Harlen, 2009; Hume & Coll, 2009; Klenowski, 2009; Poskitt, 2014; Wiliam, 2011b). ‘Assessment for learning’ and ‘assessment as learning’ form part of daily teaching with the objective of assisting students to attain the next step in their learning (L. Earl, 2013; J. Gardner, 2011b). For this reason, ‘assessment for learning’ and ‘assessment as learning’ are referred to as pedagogical functions of assessment (Remesal, 2011). ‘Assessment for learning’ actively engages students in their learning, thereby progressively encouraging them to become autonomous learners (Swaffield, 2011). ‘Assessment as learning’ is regarded as a subset of ‘assessment for learning’ (L. Earl, 2013; Fenwick, 2017) and concerns developing students’ cognitive and metacognitive competence in self-evaluating their learning (Lam, 2016). Even if ‘assessment of learning’ can be used to enhance students’ learning (Harlen, 2007), it is not primarily exercised to assist learning (Fenwick, 2017) and involves making a final judgement about students’ learning through reporting and grading (J. Gardner, 2011b; Lam, 2016) to different audiences in society. Hence ‘assessment of learning’ may be referred to as assessment for societal function (Remesal, 2011).

Though the assessment process is regarded as a bridge between teaching and learning, Stiggins (2014) argues that “teaching and assessment have become separated” (p. 67). This separation has prevented teachers from acquiring and developing the necessary assessment skills to enhance students’ learning (Stiggins, 2014). In some cases, teachers lack the skills to interpret the results, use data to adjust their teaching or identify the purposes of assessment (Santi & Vaughn, 2007).

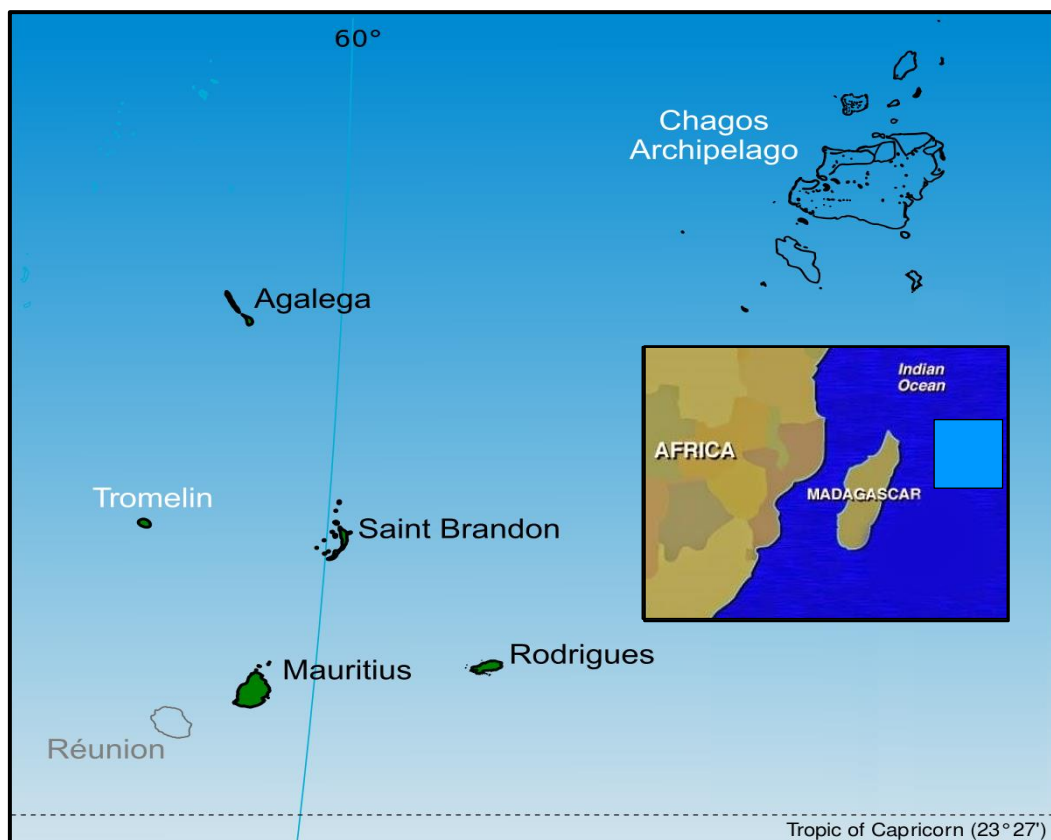
Assessing students’ learning is deemed a complex practice where teachers are expected to possess different types of knowledge. For example, teachers are supposed to have knowledge of assessment, knowledge of curriculum, knowledge of content, knowledge of pedagogy and knowledge of their students (Gess-Newsome, 2015; Poskitt, 2014). With changing political climates, Poskitt (2014) argues that teachers are compelled to respond to new demands and attune their practice accordingly.

A review of the literature indicates that high-stakes testing may adversely affect teaching, learning and assessment (Black & Wiliam, 1998; Madaus & Russell, 2010; Stobart & Eggen, 2012). High-stakes testing has several purposes, such as selection, placement and raising standards (Stobart & Eggen, 2012), but the principal function is schools' accountability to different stakeholders (West, 2010). Accountability, an international phenomenon, is "part of the performativity agenda" (Hayward, 2015, p. 31), which has adverse effects on teachers' practices (Stobart & Eggen, 2012). Ball (2003) explains that performativity is a mode of regulation that uses judgements and comparisons as means of control, attribution and incentive. Since the performances of individuals and institutions are used as a measure of productivity, when teachers focus on standards and accountability, they tend to ignore the process of teaching, learning and assessment. Hence, the direction needed to improve learning is lost (Black & Wiliam, 1998). Instead, teachers tend to drill for tests (Stobart & Eggen, 2012), with the aim of improving students' examination results to demonstrate their teaching performance.

One prominent cause for many teachers having a poor sense of direction in implementing assessment to improve students' learning is lack of teacher education on educational assessment. Popham (2009) argues that many teachers have little knowledge about educational assessment, and for some, 'test' is synonymous with 'assessment'. Deneen and Brown (2016) and Popham (2009) emphasise that teachers (as well as administrators and principals) require professional development to develop their assessment knowledge, understanding and skills. I now present my rationale for undertaking this study in the Republic of Mauritius.

## **1.2 Personal Rationale for this Study**

My country, the Republic of Mauritius, is situated in the Indian Ocean and comprises six islands (see Figure 1.1) Mauritius, Rodrigues, Tromelin, Saint Brandon, Chagos Archipelago, and Agaléga Islands (Ramessur, 2002; Wikipedia, 2017). The main island, Mauritius, of which I am a native, is located about 880 kilometres off the east coast of the Republic of Madagascar.



*Figure 1.1.* Islands of the Republic of Mauritius

*Note.* Adapted with permission under creative commons (CC BY-SA 3.0) from “Chagos Archipelago sovereignty dispute” by Wikipedia, 2017.

Throughout my schooling, I engaged with the traditional method of learning. My formal education started when I was five years old and continued until I completed my Bachelor’s degree in Manufacturing Engineering. Throughout this learning journey, I focused on revisiting, memorising and preparing for regular tests and examinations. At primary and secondary levels, the preparation for tests and examinations was done individually, while at the tertiary level, revisiting was done both independently and in groups.

I joined the teaching profession immediately after completing my degree in 2003 and taught D&T in three secondary schools for seven and a half years. I taught D&T at a private secondary school in Rodrigues, for one and a half years. Then I joined the Ministry of Education (MOE) and taught D&T across all levels for six years. For the first three years, I taught low ability students at a rural state secondary school, and for the remaining years, I taught high ability students at an urban national secondary school.

My learning experiences from primary to tertiary guided the way I taught and assessed students. I used traditional teaching and assessing methods, with which I was acquainted during my learning. For the initial five and a half years that I taught, there was no National Curriculum document. Thus, my teaching and assessment were based on the schools' prescribed textbooks and guidelines. My primary goal was that all my students pass the end-of-year internal and international examinations. I prepared the students to get good grades.

However, from 2007, I gradually started using student-centred approaches to teaching and assessment. This change occurred due to my undertaking a two-year Postgraduate Certificate in Education in D&T at the Mauritius Institute of Education, the only teacher education institution in the Republic of Mauritius. Throughout the professional development course, I tried to improve my teaching and assessment practices. I completed a Postgraduate Diploma in Education in 2009 and a Master of Education in 2010 at the University of Waikato, New Zealand. Thenceforth, I again transformed my teaching and assessment and aligned it with the *National Curriculum Framework: Secondary* (NCFS) (MOEHR, 2009), which was introduced in 2009. From 2011 to 2012, apart from teaching D&T (at the same national secondary school), I served as a part-time academic at the Mauritius Institute of Education. In 2013, I joined the teacher education institution (in Mauritius) as a full-time academic (lecturer) and continued serving the Department of Curriculum Studies and Evaluation, lecturing the modules of Assessment and Evaluation, and Curriculum Studies to both primary and secondary school teachers (beginner, current and aspiring teachers).

Throughout my teaching career, I observed that teachers focus more on tests and examinations (internal, local and international) than on principles of effective assessment. It seemed to me that the teachers in the Republic of Mauritius conducted regular tests while they neglected other forms of assessment. Despite the introduction of the NCFS (MOEHR, 2009), teachers' assessment practices appeared unaltered.

The feedback I received at the Mauritius Institute of Education, while interacting with beginner and current teachers, as well as those intending to teach (HSC to Master degree holders), also indicated that many teachers used tests and examinations throughout the year. It seemed that the main reasons for teachers to conduct tests continuously were to assess students' performance to obtain marks that were used to report to parents and prepare them for the various examinations.

These observations and interactions caused me to question the assessment practices of teachers when they complete their teacher education programmes. Were teachers changing their assessment practices? Were teachers implementing 'assessment for learning' practices (and if yes, how?), identifying the learning intentions, and informing students about their progress and what they needed to achieve next?

Since little attempt has been made to explore D&T teachers' 'assessment for learning' practices in the Republic of Mauritius, I chose to research this area. According to Lam (2016), 'assessment for learning' has been researched extensively in the last two decades. However, its applications for enhancing teaching and learning have been underrepresented in D&T. Hartell, Gumaelius and Svärth (2015) claim that prior research on teachers' assessment practices in Technology Education is rare (as explained in Chapter Two, the term D&T is associated with Technology Education).

Williams (2016), who analysed numerous Technology Education research studies (1,498 conference publications and journals) from 2006 to 2015, found a lack of research on teachers' assessment practices in Technology Education. Williams (2016) states that over this decade, "research into areas of *Design* and *Curriculum* [original emphasis] have always been fundamental and common areas of inquiry ... will continue to dominate research in technology education" (p. 273). D&T teachers' 'assessment for learning' practices seem under-researched and are therefore worthy of further attention.

Before ending this introductory chapter, I have provided an overview of the main areas of the thesis.

### **1.3 Overview of this Thesis**

This thesis explores D&T teachers' 'assessment for learning' practices in state secondary schools in the Republic of Mauritius. With the purpose of explaining how the D&T teachers' 'assessment for learning' practices were framed, I have organised the study into eight chapters.

This chapter has presented an overview of assessment and some of the issues related to assessment. This chapter also provided my educational background and research interest in the areas of assessment and D&T.

Chapter Two, the literature review, provides a review of recent and relevant research. The first chapter presents reviews of the literature relating to assessment, 'assessment for learning' and Technology Education, to develop an overview of the field of study. This chapter introduces and critiques the theoretical framework of social constructionism which underpins the study. It also discusses the additional theoretical perspectives, such as Bourdieu's (2002) notion of habitus, Foucault's (1980, 2002) concept of power-knowledge, and Bronfenbrenner's (1979) ecological systems model, that were employed for critiquing the role of assessment in this study.

Chapter Three summarises and synthesises the background and contextual information, as follows: the Republic of Mauritius' culture, its education system, curriculum, and assessment and the D&T context. This chapter also identifies the gaps in the area of 'assessment for learning' and in D&T. A critique of the contextual literature is also included. Finally, this chapter outlines the research questions.

Chapter Four provides the philosophical perspectives that underpin the ethnographic methodology for gaining insights into D&T teachers' 'assessment for learning' practices. This chapter also elaborates on mixed methods research, and the multiple methods (questionnaires, interviews, observations, secondary documents and field notes) considered appropriate for this study. The chapter



explains the process of data collection gathered in three stages. This chapter ends by outlining the relevant ethical considerations and describing how quality was preserved throughout the study.

Chapters Five, Six and Seven present the findings of this study. These chapters are structured and presented based on the data sources—teacher interviews, teachers’ practices in the classroom and student interviews.

Chapter Eight answers the research questions posed in this study. This chapter synthesises the findings presented in chapters five, six and seven in relation to the extant literature. The chapter first addresses the four sub-research questions and then answers the overarching research question—how are the ‘assessment for learning’ practices of D&T teachers framed?

Chapter Nine begins with several conclusions arising from the discussion chapter and presents the potential contributions of this study for research and education, including teachers’ practices in the Republic of Mauritius context. This chapter elaborates on the limitations of the research design and includes several recommendations for further research. The chapter ends with a final comment.

## **Summary**

This chapter presented the background of this study and raised several concerns relating to the research area. This chapter also provided an overview of my educational background, research interest in the field of assessment and the happenings in the Republic of Mauritius education system that demanded such an investigation. The next chapter provides the reviews of the literature relevant to the research questions and theoretical framework that helped to structure this research.

# CHAPTER TWO

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## LITERATURE REVIEW

An exploration of the literature on teachers' practices associated with 'assessment for learning' was essential for this study. The aim of the review was to evaluate and critique the literature related to teachers' 'assessment for learning' practices in Design and Technology (D&T).

After the introduction, this chapter is divided into two main sections. The first section examines the literature related to educational assessment, followed by three fundamental purposes of educational assessment: formative, summative and evaluative. Then the section evaluates selected current issues in educational assessment, which include multiple purposes of assessment, testing, assessment literacy, and the tensions (or confusion) between formative and summative assessment. Afterwards, the section focuses on 'assessment for learning', followed by an overview of Technology Education and 'assessment for learning' in D&T.

The second section of this chapter presents the theoretical framework that informed this study. This section begins by providing a review of the instructivism–constructivism debate on learning and assessment. Then the second section focuses on sociocultural theory, which is of particular relevance to this study. The section ends by exploring Bronfenbrenner's (1979) ecological systems theory, and Bourdieu's and Foucault's critical theories as part of the theoretical framework used to analyse the influence of context on teachers' 'assessment for learning' practices.

The literature review was generated by adopting several strategies. Gall, Gall and Borg's (2007), Hart's (2001), and Ogawa and Malen's (1991) strategies for writing a literature review were considered (Boodhoo, 2017). Cooper's (1986) strategies for literature search were also adopted. The databases for literature search included A+ Education, ERIC (via Proquest), Education Research Complete, New Zealand Council for Educational Research: Journals Online, ProQuest Education and ProQuest Science & Technology. The primary search terms used were purposes of

assessment, ‘assessment for learning’, formative assessment, assessment literacy, Technology Education, constructivism, social constructivism, Bourdieu, Foucault, Bronfenbrenner, teachers’ beliefs and practices, professional learning, and communities of practice. These terms were also paired with several descriptors, such as assessment, learning, secondary school, teachers’ practices, students and learners.

## **2.1 Assessment in Education**

Classroom assessment has short-term, medium-term and long-term consequences on teaching and students’ learning (T. J. Crooks, 1988). The consequences are dependent on the type of information collected and purposes of assessment (K. Earl & Giles, 2011). Different stakeholders use assessment information for different purposes because each stakeholder group has distinct sets of agendas, understandings and values of assessment (Stables, 2015). The next section introduces the two contexts of assessment in which the purposes are embedded: assessment managed by teachers, and assessment administered by educational leaders and policymakers (by agencies external to the school). Then the three key purposes of assessment—formative, summative and evaluative—are discussed.

### **2.1.1 Purposes of assessment**

Educational assessment is developed and managed by two different groups and conducted at various times in schools, as shown in Table 2.1 First, by teachers and schools, and second, by agencies external to the school (Black, 1998; C. Harrison, 2013; Newton, 2007, 2010; Oosterhof, 2009; Pellegrino, Chudowsky, & Glaser, 2001; E. Smith & Gorard, 2005; Wiliam, 2011). The external agencies could include private testing companies, school districts and local examination authorities. There are distinctions between the two groups (Black, 1998; Newton, 2007; Pellegrino et al., 2001). For an in-depth comparison, Pellegrino et al. (2001) proposed first to distinguish who the users are, what they know, and what they intend to learn. Table 2.1 also shows the three main assessment purposes, discussed in sections 2.1.2–2.1.4, that fall under the two different groups.

Table 2.1 *Educational Assessment Setting and Three Main Purposes*

Managed by teachers and schools		Managed by agencies external to the school	
Formative purpose	Summative purpose		Evaluative purpose
	<i>Internal control</i>	<i>External control</i>	
Identify learning needs	Report students' achievement and progress in learning	For certification and selection	School monitoring
Monitor progress			Programme evaluation
Improve teaching			System monitoring

When teachers administer an assessment, they want to know how well a student is learning, what the student might learn next and how to shape further learning of each student (Pellegrino et al., 2001; Popham, 2014; Shermis & Di Vesta, 2011). To effectively monitor and improve students' learning, teachers require information that is closely related to their students' works. Pellegrino et al. (2001) stipulate that classroom assessments should be individualised and contextualised to achieve this goal.

Research suggests that in teacher-managed assessments, both teachers and students should use assessment to support learning on a day-to-day or even moment-to-moment basis (L. Earl, 2013; Pellegrino et al., 2001; Shermis & Di Vesta, 2011; Witte, 2012). For Pellegrino et al. (2001), teaching and assessment should be integrated, where learners are continuously provided with feedback, such as the quality of their work and how they can improve. Students can be allowed to partially take control of their assessment (when enacting formative assessment purpose only) and contribute to decisions about assessment types and timings. However, this may not be allowed (or possible) in all educational contexts and/or at all levels.

Teacher and school-managed assessments are used to appraise students' achievement over time, such as after each term and each year. The appraisal of students' performance and achievement status could be summarised for schools' records (L. Earl, 2013; Shermis & Di Vesta, 2011; Waugh & Gronlund, 2013; Witte,

2012) which are used by different stakeholders. For example, teachers' reports are required to identify special learning needs of individual students. These assessment reports are also used by future teachers to judge the readiness of students to learn new topics (Shermis & Di Vesta, 2011). Parents are also interested in the reports of their child's achievement.

Educational leaders and policymakers use agency-managed assessment (also referred to as large-scale assessment) to evaluate educational programmes. The large-scale assessment results may likewise be used to gain various types of information on students, teachers and schools (Pellegrino et al., 2001; Shermis & Di Vesta, 2011). Policymakers and educational leaders' goals include improving performance, measuring achievement between schools and over time, and allocating resources (Pellegrino et al., 2001).

Teacher- and agency-managed assessments include three main assessment purposes (Black, 1998): assisting learning, reporting achievement for certification, growth and transfer, and public accountability. These three purposes (see Table 2.1) have been termed as formative, summative and evaluative (Black, 1998; Kimbell & Stables, 2007; Newton, 2007; Pellegrino et al., 2001) and are discussed in the next section.

### **2.1.2 Formative assessment**

Formative assessment serves multiple purposes, but the primary purpose is promoting students' learning and informing teaching (Black, 1998, 2015; T. Crooks, 2011; Dirksen, 2014; Fox-Turnbull, 2006; Keeley, 2011; Newton, 2007, 2010; Torrance, 2012). This section elaborates on identifying students' learning needs, monitoring students' progress and improving teaching.

#### ***Identifying learning needs***

The identification of students' learning needs provides crucial information to inform teaching (Dirksen, 2014; Newton, 2007) and could be done by using pre-assessments before teaching (C. S. Taylor & Nolen, 2008), which helps teachers plan their teaching. Understanding that learners have individual needs, teachers

require sound information to adjust the subject content, their teaching styles and pace to satisfy the needs of their learners (Black, 1998; Fox-Turnbull, 2006; Newton, 2007; Shepard, 2000; Stiggins, 2014).

Teachers may also try to find out whether students have the necessary background knowledge (C. S. Taylor & Nolen, 2008). A recent teacher-based assessment report could be used to gather information on a group of students. For example, if a teacher identifies a group of students having difficulties using a pair of set squares to draw parallel lines, then he or she could design specific activities for these students.

### ***Progress monitoring***

The process of monitoring students' progress helps teachers to recognise if learners need additional help or if their learning needs to be accelerated (Fuchs & Fuchs, 2010; Newton, 2007; Romain, Millner, Moss, & Held, 2007). Through assessment, teachers may recognise if learners require additional support in a particular area (Fuchs & Fuchs, 2010; Romain et al., 2007). For example, a group of students with learning difficulties may need additional guidance and support (Santi & Vaughn, 2007). Another group of students may have mastered the concepts and require activities with a higher level of difficulty.

The assessment used to monitor progress allows teachers to ensure that individual students are consistently and sufficiently progressing towards set goals over time (Fuchs & Fuchs, 2010; Newton, 2007; Santi & Vaughn, 2007). When teachers frequently use progress monitoring, it is easier for them to identify the weaknesses of students and intervene promptly to improve students' learning.

### ***Improving teaching***

When teachers use assessment to identify the needs and monitor the progress of their students, they are likely to adjust (improve) their teaching in response to immediate learning requirements (Darling-Hammond, Amrein-Beardsley, Haertel, & Rothstein, 2012; Davidovitch & Soen, 2006; Dirksen, 2014; Shepard, 2000; Sun & Suzuki, 2013) and transform their practices (Fautley & Savage, 2013; Lassonde,

2009; Pelech, 2013). This section elaborates on the two levels of improvement of teaching: teaching decisions and transforming practice.

Teaching decisions can be categorised into three types, namely “moment-by-moment decisions, short-term planning, and long-term planning” (Shepard, 2000, p. 63). The moment-by-moment decisions are based on observation and questioning during teaching, where teachers usually decide to refine or redirect teaching to address misconceptions or extend a lesson through insights gained on students’ progress. The short-term planning is a recursive process that helps teachers shape lessons and ensure that there is a close integration between teaching and assessment. To effectively plan, teachers review the learning goals, and readjust questions and activities that might be used. Finally, the long-term planning is about teachers addressing learning goals and assessing learning across a variety of contexts and modes, in line with students’ experiences.

Transforming practice is considered critical for teaching effectiveness and could be considered a continuum (Murray, 2015; Shepard, 2000). At one end of the continuum, ongoing assessment is used to adjust lessons. Midway on the continuum, the assessment information aids in planning the curricula, through the evaluation of subject content, students’ interest in the content, the effectiveness of activities and examples in attaining the desired lesson outcomes. At the other end of the continuum, assessment can be used to reflect on teaching practices. The idea at this end of the spectrum is about examining, critiquing and justifying the decisions taken during teaching (Murray, 2015; Shepard, 2000), for example, why some teaching strategies were more effective than others.

### **2.1.3 Summative assessment**

In its summative role, assessment is conducted to report students’ achievement at a particular time (Daugherty, 2010; Harlen, 2007). It is carried out by “summarising achievement across a period of time up to reporting date” or “giving an examination or a test at that time” (Harlen, 2007, p. 16) or a combination of both. In primary and secondary schools, either the teacher and school (internal control) or agencies

external to the school (external control) manage summative assessment (see Table 2.1).

### ***Internal control***

Summative assessment for internal purposes is administered by teachers (Oosterhof, 2009) “within the limits of the school’s policy on assessment” (Harlen, 2007, p. 53). The purpose of summative assessment, when controlled internally, is to report students’ achievement and progress in learning (K. Earl & Giles, 2011). Teachers’ summative assessment mentioned here excludes assessment that is developed and marked by teachers (for external examining organisations), administered by teachers and marked externally. Harlen (2005b) claims that in this process “teachers gather evidence in a planned and systematic way to draw inferences about their students’ learning, based on their professional judgement, and to report at a particular time on their students’ achievements” (p. 247).

The reporting of students’ achievement and progress is done for different stakeholders serving different purposes (Black, 1998; K. Earl & Giles, 2011; Harlen, 2007). For example, the students’ reports are handed to parents and students, teachers and school administration. At regular intervals, information is reported to parents and students to provide insight into the students’ achievement and progress (Black, 1998; Harlen, 2007).

Students’ reports are also passed on to other teachers. When students move from one class to another, mostly after an academic year, there is the likelihood of teachers being changed. The new teachers could use the reports to get an overview of each student’s recent achievement and progress to plan instructional activities and guide learners’ in the process of learning (Black, 1998; Harlen, 2007; Pellegrino, 2002). However, if detailed information (such as assessment criteria) is not available, then the report cannot be used to plan for remedial work.

Another reason for reporting is to verify what students have learned over time (Black, 1998; Harlen, 2007; Pellegrino, 2002). For these judgements, the evidence is compared with criteria that are corresponding for all students at a particular



school, in subjects that are examined (Black, 1998; Harlen, 2007), but provided that the assessment is criterion based. These records may be used for guiding decisions about subjects. For example, the records could show that students have not been performing well in a particular subject. Then the school administration team might attempt to find the cause of the problem and try to improve the situation.

### ***External control***

Stakeholders use summative assessment results for external control both inside and outside schools to generate information for certification and selection (Black, 1998; Gipps, 1999; Harlen, 2007; Moss, 2012; Pellegrino et al., 2001). In this case, through common examinations, students across various schools/colleges are treated equally against the same set of criteria. Examinations and tests are considered as forms of summative assessment as they are specifically used to gain information about individual student achievement at a particular time (Harlen, 2007, 2009; Pellegrino et al., 2001). These tests and examinations are often referred to as standardised tests because for each attempt, standardised procedures are followed (Oosterhof, 2009; Pollio & Hochbein, 2015). A set of grades/percentage or scaled numbers obtained from several subjects serve the users (employers and universities for example) in selecting potential candidates to suit their purposes (Black, 1998; Pellegrino et al., 2001).

In a few countries, the responsibilities of certifying students are left entirely to teachers, while in most countries, external and school-based assessments are combined in various ways to certify students' performance (Black, 1998; Brookhart, 2012; Daugherty, 2010). For example, in Queensland, Australia, a teacher-moderated assessment (the Queensland senior assessment model) is used, while the school-based assessment is externally moderated at years 11 and 12 (Klenowski, 2013).

There seems to be a dichotomy between the “purely formative” and “purely summative” assessment purposes (Harlen, 2007, p. 121). Harlen (2007) proposes a dimension of assessment purposes between the two extremes of assessment purposes. She claims various assessment activities between these extremes could

be described, such as “formal formative (mainly formative assessment with some summative use)” and “informal summative (mainly summative assessment but with some feedback into learning)” (Harlen, 2007, p. 121). Thus, information gathered for formative purposes (as part of day-to-day activities) could be aggregated at specific moments to recognise students’ achievement (Black & Wiliam, 2003; Harlen, 2007). Conversely, an informal test could be set for a teacher to know what students have learned in a topic. Based on the outcomes of the informal test, the teacher could provide feedback to students on what they may not accomplish, as well as plan for future teaching (Harlen, 2007). However, if the teacher collects assessment information (aggregates) from assessments designed to serve a summative purpose, the aggregates cannot be used to identify learning needs (Black & Wiliam, 2003).

Another assessment purpose, evaluation, is used to judge schools, teachers, administrators, and educational programmes. The next section elaborates on school monitoring, programme evaluation and system monitoring.

#### **2.1.4 Evaluative purpose**

School monitoring and evaluation are mainly carried out to hold educational providers accountable, regulate intended levels of educational provisions and outcomes, and support ongoing improvement in education (Scheenes, Glas, & Thomas, 2003). Aggregated results of students’ performance in various public examinations are used to decide whether schools’ standards are rising or falling over time (Black, 1998; Braden, 2007; Jacob, 2005; Madaus & Russell, 2010). Based on the status of the school standards, several actions, such as sanctions and rewards to schools and teachers, might follow.

Sanctions can take place in schools depending on whether specific performance criteria have been met or not (Figlio & Page, 2003; Madaus & Russell, 2010; McDonnell, 2013). Students’ aggregated results are used to evaluate teachers. B. Jacob (2005) criticises the United States’ *No Child Left Behind Act* of 2001 which strengthened a movement towards accountability. B. Jacob reports that in 2002, 18 states in the United States rewarded administrators and teachers for excellent

student performance. In some states, a pay-for-performance system was used to compensate teachers on their performance and the performance of their students (McCabe, 2005). Similarly, in 2008, the Pay Research Bureau recommended the introduction of a performance management system in the Republic of Mauritius (Sharma, 2016). This recommendation was introduced in 2010 with the aim to evaluate the level of performance of state school teachers and obtain better output from them.

An alternative approach to aggregated results is 'light sampling' (Kimbell & Stables, 2007; Klenowski & Wyatt-Smith, 2012). Several countries, such as the United States and England, have adopted this approach as it avoids the endless aggregation of individual student data and minimises as far as possible the load on any one student or school (Kimbell & Stables, 2007). Light sampling involves randomly selecting only some schools for each survey, and assessing a small number of students from those schools, a method that allows a high degree of accuracy of the whole student population (Newton, 2008).

Programme evaluation is conducted to allow policymakers to judge a particular programme (Rallis & Bolland, 2005) and to know to what extent students changed as a result of educational experiences (Healy, 2000; Rallis & Bolland, 2005). Data is systematically gathered to know how educational programmes achieve the goals set by the policymakers (Rallis & Bolland, 2005). Depending on data collected, decisions are made to improve programmes.

Assessment data could be used to make several kinds of decisions on educational programmes (Shepard, 1979). For example, description of current status, comparison of programmes over time, the comparison between competing programmes and programme diagnosis (internal comparisons) (Newton, 2007; Shepard, 1979). When different examination boards assess students at a particular level, there must be sufficient comparability of standards between boards, for both earlier and later assessments (Newton, 2007).

System monitoring is mainly done to hold civil servants and politicians accountable for the quality of the education system that is being paid for by the Government.

Different results (using either ‘light sampling’ or aggregated data) can be used to determine whether the educational system standards are rising or falling over time (Newton, 2007). Based on the required purpose, system monitoring can be divided into a focus on short-term, medium-term or long-term trends (Newton, 2007). System monitoring can equally be sub-divided differently: into systems that are oriented more towards monitoring curriculum evaluation and planning, such as the New Zealand’s National Education Monitoring Project (Darr, 2017); or systems that are positioned more towards overall educational standards, such as the United States’ National Assessment of Educational Progress (Davies, 2018).

This section provided a brief literature review of the three central assessment purposes: formative, summative and evaluative assessment. The next section examines the literature on selected current issues in educational assessment.

### **2.1.5 Issues in educational assessment**

With contending theories, practices and diverse stakeholders’ demands, educational assessment is constantly being challenged (McDowell, 2010). Many researchers have questioned the current and conventional (static and dynamic assessment, further discussed in section 2.2.1) ways of thinking about educational assessment (Bloxham & Campbell, 2010; Harlen, 2005a; Newton, 2007; M. Price, Handley, Millar, & O’Donovan, 2010; Pryor & Crossouard, 2010). For example, there are concerns about the impact of high-stakes testing and examinations on learners’ motivation for learning, and the adverse effects on teachers and the curriculum (Harlen, 2005a). Since this study focuses on assessments conducted by teachers (teachers’ ‘assessment for learning’ practices), this section elaborates on three concerns related to such assessment practices: multiple purposes of assessment, testing, and tensions between formative and summative assessment.

#### ***Multiple purposes of assessment***

Earlier sections (2.1.2, 2.1.3 and 2.1.4) elaborated on the three central purposes of assessment (formative, summative and evaluative), which clearly explain what each purpose involves. Still, various misunderstandings have created confusion amongst teachers and policyholders when classifying assessment purposes under the three

categories (Harlen & Gardner, 2010; C. Harrison, 2013; Hartell, Gumaelius, & Svårdh, 2015; Newton, 2007, 2010). Newton (2007) argues that when simplifying assessment purposes and allocating them to a category (formative, summative or evaluative), there is a risk of sending the wrong message, such as the sub-purposes within each category are similar. Accordingly, there is an impression that results “which are fit for one sub-purpose within a category will be fit for the other sub-purposes as well” (Newton, 2007, p. 161).

A simplistic view of the three primary assessment purposes (formative, summative and evaluative) may not take into consideration the various assessment purposes that schools and teachers utilise (C. Harrison, 2013; Newton, 2010). Teachers may also have difficulties considering the specific assessment purposes for which they were designed (C. Harrison, 2013; Newton, 2010). If teachers use the wrong assessment method, then inadequate or misleading information could be gathered and judgements could be made for the wrong reasons. It is now well established from various studies that educational assessment serves different purposes at different times (Black, 1998; L. Earl, 2013; Harlen & Gardner, 2010; Harlen & James, 1997; C. Harrison, 2013; Newton, 2007, 2010; Pellegrino et al., 2001; Wiliam, 2011). So L. Earl (2013) and Newton (2007, 2010) argue that it is important to locate a broad range of assessment purposes with the aim of helping teachers ensure they know what they are assessing.

Newton (2007, 2010) suggests shifting the focus away from distinguishing main assessment purposes to clarifying the use of the assessment. In fact, both Harlen (2012) and Newton (2007, 2010) object to the simplistic grouping of assessment types because it might be misleading. Newton (2007) argues that it is possible to locate multiple purposes within these main assessment categories and identifies 22 such purposes. He emphasises that this is not a complete list and if each purpose was considered in detail, the number of purposes would increase. Some assessments using focusing on students’ learning include student monitoring, formative, diagnostic, screening, provision eligibility and segregation.

Assessment purpose can be identified depending on the aim of the teacher when setting an assessment (Harlen & Gardner, 2010; Newton, 2010; Pellegrino et al.,

2001). A single assessment system could effectively support two purposes. However, Newton (2010) suggests that it would be “more manageable and cost-effective to develop separate assessment systems, each tailored to their intended uses of results and each with their own compromises and trade-offs” (p. 395).

This section emphasised the need for assessment users to understand each assessment purpose. The next section briefly elaborates on the relationship between assessment and testing, and discusses the uses of high-stakes testing and its effects on teaching, assessment and students’ learning.

### ***Testing***

Gipps (2011) explains that a wide range of methods are used to assess students’ learning, and testing is one method. Both Gipps (2011) and Marchant (2004) identified two fundamentally distinct types of testing: standardised and non-standardised tests.

A standardised test is referred to as an examination that is “administered and scored in a predetermined, standard manner” (Popham, 1999, p. 8) that makes it possible for comparison (norm-referenced). Standardised testing requires all test takers to take the same test or choose questions from a common pool of questions. The standardised tests are performed at the end of teaching (summative), and the results are later communicated to teachers concerned.

On the other hand, non-standardised test results are used mostly for formative purposes, but these could be used for summative purposes at school level (Gipps, 2011). For example, the formative results of testing can be used to identify students’ needs, group students, evaluate teaching or provide feedback to students on their learning. Non-standardised tests are also referred to as tests assigned under different conditions. For example, different groups of learners could be administered in various ways, such as the time allowed for completing a test. The scoring (evaluation) of the non-standardised tests could also be done differently for diverse students.

Data gathered from standardised and non-standardised tests are used for different purposes (Gipps, 2011; Marchant, 2004; Marlow et al., 2014; Minarechová, 2012). Data gathered from standardised tests are mostly used for accountability purposes, at state, national or international levels, while the non-standardised tests data are mostly used for decision-making at classroom level such as assigning students to teaching groups and evaluating teaching.

Standardised tests may have both positive and adverse effects, as well as strong and weak effects (high- or low-stakes) on teaching and learning (Loumbourdi, 2014). When tests have considerable effects, teachers have a tendency to teach to the test and students focus on passing the test (Brooks & Tough, 2006). The next section elaborates on high-stakes testing, its uses and effects.

#### *The uses of high-stakes testing*

In many contexts, testing is considered to be a vital instrument in the development of a quality education system (Minarechová, 2012). It is undeniable that testing generates useful indicators that inform an institution's actions, and even unveils continuous achievement gaps in high-achieving institutions (Starr & Spellings, 2014). As indicated earlier (see section 2.1.4), testing policy, for example, serves as an accountability tool ensuring value for the investment of tax revenue (Madaus & Russell, 2010; Starr & Spellings, 2014).

Madaus and Russell (2010) claim that policy makers are conscious that challenges associated with tests and examinations are driving teachers to tailor their teaching to preparing learners for high-stakes testing. However, Starr and Spellings (2014) stress that the accountability policies and tests do not narrow the enacted curriculum by themselves. It is the teachers who adopt an examination-oriented mode of teaching that leads to curriculum distortion and results in improper learning (Starr & Spellings, 2014).

#### *The effects of high-stakes testing*

Many research studies indicate that high-stakes testing is having harmful effects on students' learning and on teachers' practices (C. Harrison, 2013; Loumbourdi, 2014;

Madaus & Russell, 2010; Minarechová, 2012; Plank & Condliffe, 2013; Reich & Bally, 2010; Ryan & Weinstein, 2009; Stobart & Eggen, 2012). C. Harrison (2013) claims that high-stakes testing causes anxiety in students, particularly in low performers. The weaker students' (and those with low self-esteem) willingness to make an effort in their learning is reduced significantly due to their regular underperformance, which might be understood through attribution theory. B. Weiner (2010) claims that "perceived causes of events are virtually infinite" (p. 366), but views ability and effort as the leading causes in attaining failure and success, although other determinants such as luck and task difficulty are also recognised as influencing achievement outcomes. Weak students tend to abandon attempting challenging activities because they consider the struggle as a failure, thereby influencing their future learning (C. Harrison, 2013; Martin, 2010).

A negative impact of high-stakes testing is that students may focus more on preparing for the tests than on their learning (Boyle & Bragg, 2006; Stobart & Eggen, 2012). For example, learners could become test-oriented (Boyle & Bragg, 2006) and instead of focusing on learning, they aim to pass an examination by adopting memorisation techniques, or learn selected content from textbooks, which are more likely to appear for the examination. Students could also practice answering similar questions offered during examinations. Because of the high-stakes, students may view learning as a competition, leading to inadequate collaboration with peers.

When tests have high-stakes, teachers could be forced to adopt strategies that improve students' performance (Loumbourdi, 2014; Reich & Bally, 2010). With the intention that students perform well, though not in all contexts, teachers may devote a considerable amount of their teaching time to the knowledge and skills assessed by the high-stakes tests (C. Harrison, 2013; Loumbourdi, 2014). Teachers' focus could also be on test-taking (low-level) skills (Boyle & Bragg, 2006; Loumbourdi, 2014; Plank & Condliffe, 2013). Thus, curriculum distortion (also termed as a 'curricular magnet') takes place (Gipps, 2011), narrowing the curriculum to match examination, as a result of which learning is affected (Loumbourdi, 2014).



With high-stakes tests, teachers may adopt activities that maximise test successes (Sullivan, 2006). For example, if a test is composed of multiple-choice items, teachers may be inclined to use multiple-choice question items only in their teaching, thereby penalising students with opportunities to learn from another form of activity, such as designing and making activities.

Kapambwe (2010) advocates the reduction of high-stakes testing to a minimum due to its negative influences on students' learning. Apart from an overuse of testing, other issues creating tensions between the formative and summative assessment purposes are discussed in the next section.

### ***The tensions between formative and summative assessment***

Harlen and James (1997) express concerns about misunderstandings between the formative and summative purposes of assessment, in the United Kingdom, as a consequence of which assessment misses a truly formative role in learning. Several studies have reported the same misinterpretations in many other countries, especially in Europe, as well as in Australia, New Zealand and the United States (Bachor & Anderson, 1994; Black, Harrison, Lee, Marshall, & Wiliam, 2003; T. Crooks, 2011; Harlen & James, 1997; Taras, 2010; Ussher & Earl, 2010).

It seems that the tensions between the formative and summative purposes (Harlen & James, 1997; Hayward, 2015; Ussher & Earl, 2010) occur due to three main reasons. First, the way the two terms ('formative' and 'summative') are referred to in policy documents. Formative and summative assessments are both elements of many national assessment policies. In theory, the two terms imply different roles, but the way they are referred to in policy documents has created misunderstandings amongst some teachers (Harlen & James, 1997; Klenowski, 2009; Newton, 2007). Because of the way the two terms have been related, "the essential differences between them have been smothered" (Harlen & James, 1997, p. 365).

Second, the shortening of the two terms to formative and summative assessment creates confusion in teachers' minds. The terms formative and summative should read as 'assessment for formative purposes' and 'assessment for summative

purposes' (Ussher & Earl, 2010). A small qualitative study with in-service and pre-service teachers in New Zealand conducted by Ussher and Earl (2010) revealed that when the terms formative and summative were linked to assessment, misinterpretations arose. Ussher and Earl (2010) argue that this confusion was more intense for pre-service and novice teachers.

Third, misinterpretation arises due to the use of the term 'teacher assessments'. There is a misconception that all assessment carried out by teachers is formative in nature because teachers usually conduct formative assessments (Harlen & James, 1997). However, teachers may change their ongoing assessment practices to a set of tests (mini-assessments) which are summative in character. The assumption that all teachers' assessment is formative adds to more tensions between formative and summative assessment (Harlen & James, 1997).

Several researchers recognise the need to find ways to relate to the different functions of formative and summative assessment, while preserving their various roles and characteristics, both in theory and practice (Black et al., 2003; Harlen & James, 1997; Newton, 2007; Taras, 2010). The Assessment Reform Group (ARG, 1999) proposed that the term formative assessment is no longer helpful. The term formative has a variety of interpretations and generally "means no more than that assessment is carried out frequently and is planned at the same time as teaching" (ARG, 1999, p. 7).

The ARG (1999) adds that formative assessments do not inevitably have all the features that support learning. The ARG adopted the term 'assessment for learning', and the same term was used in this study. The next section briefly elaborates on several viewpoints of the terms formative assessment and 'assessment for learning'.

The term formative assessment was often considered to be the same as 'assessment for learning' (T. Crooks, 2011; Swaffield, 2011). However, several authors refute this claim and consider 'assessment for learning' to differ from formative assessment in numerous ways (ARG, 1999, 2002; Swaffield, 2011). For the ARG (2002) 'assessment for learning' is "the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in

their learning, where they need to go and how best to get there” (p. 9). Formative assessment is simply an ongoing assessment that comprises marking and supplying grades/marks to students or adding events or tests to the existing practice (ARG, 1999). Also, when enacting formative assessment, students could be passive recipients of teachers’ actions and decisions; but when enacting ‘assessment for learning’ learners are engaged in autonomy and agency (Swaffield, 2011).

However, Wiliam (2011) disputes the ARG’s (1999) viewpoint after analysing four definitions of formative assessment and claims that several authors have proposed slightly narrower definitions of formative assessment as their focus is on changes to instruction. For example, “assessment carried out during the instructional process for the purpose of improving teaching or learning” (Shepard et al., 2005, p. 275, as cited in Wiliam, 2011, p. 9).

Clarifying the differences between the terms formative assessment and ‘assessment for learning’ was important in this thesis because the practice of using the two terms interchangeably can lead to misappropriated utilisation and interpretation of ‘assessment for learning’. The term adopted in this study was ‘assessment for learning’ because a clear list of its characteristics was identified from the literature, which is presented in the next section. Other assessment approaches, such as ‘assessment as learning’ and ‘assessment of learning’, are also explained briefly as they relate to the main assessment purposes discussed earlier in this chapter.

### **2.1.6 Assessment for, as and of learning**

As stressed in the introduction chapter (section 1.1), ‘assessment for learning’, ‘assessment as learning’, and ‘assessment of learning’ are three distinct but intertwined assessment purposes. Each of these purposes contributes to classroom learning in different ways (L. Earl, 2013).

#### ***Assessment as learning***

‘Assessment as learning’ is part of classroom assessment where teachers allow students to reflect on and analyse their learning. According to L. Earl (2013), ‘assessment as learning’ is a subset of ‘assessment for learning’ that focuses on

students' metacognition or reflection on their own learning. However, Swaffield (2011) argues that 'assessment for learning' lacks the metacognitive and social learning elements. Dann (2014) adds that 'assessment for learning' concerns "how learning is ... supported in the ongoing assessment process" while 'assessment as learning' relates to "development of cognitive and metacognitive capacity in self-evaluating one's ... learning" (pp. 1900–1901).

'Assessment as learning' focuses on the role of students in linking assessment and learning (L. Earl, 2013; Lam, 2016). In this role, as effective critical thinkers, students act autonomously and reflexively through the use of self-assessment and self-efficacy and by adopting self-regulated behaviours (Lam, 2016). To be critical thinkers, students are expected to make sense of information, associate it with their previous knowledge, identify their learning gaps and use this information and feedback to enhance their learning, with the support of their peers and teacher (K. Earl & Giles, 2011; L. Earl, 2013). Dann (2014) emphasises that it is crucial that students understand their learning progress and recognise the goals or learning outcomes. It is through 'assessment for learning' that students develop life-long learning skills (K. Earl & Giles, 2011).

The main difference between 'assessment for learning' and 'assessment as learning' is the assessor. With 'assessment as learning', the assessors are students, while with 'assessment for learning', assessors could be both teachers and students. Since this study focuses on teachers' 'assessment for learning' practices, this investigation examined how often D&T teachers allowed their students the opportunity to assess their learning. However, 'assessment as learning' practice was not explored, as it was beyond the scope of this study.

### ***'Assessment for learning'***

The ARG (1999) claims that for an assessment to encourage students' learning, teachers ought to collect assessment information regularly, and thereby inspire students to review their work critically. The key point is that students should be involved in the process of assessment and in making decisions about their work, rather than passively receiving teachers' judgements.

The ARG (1999, p. 7) provided seven characteristics of ‘assessment for learning’ that promoted learning:

1. It is embedded in a view of teaching and learning of which it is an essential part;
2. It involves sharing learning goals with pupils;
3. It aims to help pupils to know and to recognise the standards they are aiming for;
4. It involves pupils in self-assessment;
5. It provides feedback which leads to pupils recognising their next steps and how to take them;
6. It is underpinned by confidence that every student can improve;
7. It involves both teacher and pupils reviewing and reflecting on assessment data.

Klenowski (2009) states that the principles of ‘assessment for learning’ have been misunderstood through misinterpretations of words used in past definitions of the terms ‘assessment for learning’ and formative assessment. For example, many recent studies stress that the ‘assessment for learning’ definition, provided by the ARG in 2002 (see section 2.1.5), does not sufficiently emphasise daily classroom processes (Swaffield, 2011; Torrance, 2012). Hence this definition could simply be converted to meet narrowly defined curriculum goals by teaching to the test. Due to these misinterpretations, ‘assessment for learning’ practice is distorted. Klenowski (2009) argues that the meaning of “deciding where the learners are in their learning, where they need to go and how best to get there” (p. 263) was misinterpreted. Klenowski (2009) gives further details that the ARG’s ‘assessment for learning’ definition seems to mean that teachers are to test their students regularly to measure their attainment levels on the set national/state scales. Klenowski (2009) elaborates that due to this misinterpretation, the marks which were supposed to be indicators of learning turned out to be the goals for learning. Consequently, ‘assessment for learning’ was distorted to ‘assessment of learning’.

Hence, during the third international conference on ‘assessment for learning’, held in 2009 in New Zealand, the following definition of the term ‘assessment for learning’ was proposed by Klenowski (2009, p. 264): “[‘Assessment for learning’] is part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning.”

This definition highlights that ‘assessment for learning’ should be student-centred and is a practice implemented by teachers, by clarifying the learning intentions and the criteria, providing feedback and using rich questioning for learners so that they can support themselves and one another to become autonomous learners. Klenowski (2009) stressed that the primary purpose of ‘assessment for learning’ is to assist learning. It is necessary to inform students of the following step they need to take and present them with suggestions of how to improve. This practice should be performed on a day-to-day basis, woven with dialogues and interactions amongst the students and their teachers.

According to Warwick, Shaw and Johnson (2015), ‘assessment for learning’ has been characterised as a process focused on providing qualitative insights into student understanding. They argue five key strategies, as suggested by Black and Wiliam (2009, p. 41), can be used to gain the necessary insights:

1. Clarifying and sharing learning intentions and criteria for success;
2. Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding;
3. Providing feedback that moves learners forward;
4. Activating students as instructional resources for one another; and
5. Activating students as the owners of their own learning.

B. Marshall and Drummond (2006) conducted a study inside the classrooms of 27 teachers to understand their enactment of ‘assessment for learning’. Data were collected through questionnaires, interviews and video recordings (of lessons). The researchers reported that some teachers’ ‘assessment for learning’ practices embodied “the ‘spirit’ of [‘assessment for learning’]”, while others conformed

“only to the ‘letter’” (p. 134). The term ‘to the letter’ was used to signify that the intended target of ‘assessment for learning’ was not achieved. This study revealed that nearly one-fifth of the lessons appeared to capture the ‘spirit’ of ‘assessment for learning’, which the authors characterised as “high organisation based on ideas” (Marshall & Drummond, 2006, p. 145), where the underpinning principle was to promote learner autonomy. According to B. Marshall and Drummond (2006), one possible explanation for teachers expressing the ‘spirit’ of ‘assessment for learning’ could be their beliefs, which seemed to value learner autonomy.

The literature also indicates criticisms related to ‘assessment for learning’. The study by E. Smith and Gorard (2005), which consisted of four mixed-ability groups (year 7 students), is an example. In this study, marks and grades were shared with three groups but with minimal comments, which was the common practice in the schools. Conversely, enhanced constructive feedback was provided to the other group for one year, and without giving marks and grades to any student. E. Smith and Gorard (2005) reported that growth in the groups in which students’ marks and grades were given was significantly superior to the other group.

This finding offers a potential area for further research, but the balance of evidence suggests that an ‘assessment for learning’ strategy is beneficial to learners.

### ***Assessment of learning***

The purpose of ‘assessment of learning’ is summative and is conducted at the end of a cycle or teaching programme (L. Earl, 2013; Ussher & Earl, 2010), to summarise what was learned (Harlen, 2007). Accordingly, it normally takes the form of tests or examinations, and the intention is to indicate how the students performed (L. Earl, 2013), that are reported to the students and their parents (L. Earl, 2013; Harlen, 2007; Stables, 2015). As a result, the effort teachers put into providing feedback is limited (C. J. Harrison, Könings, Schuwirth, Wass, & Vleuten, 2015). The feedback provided is mostly in the form of marks or grades with little direction given to stakeholders for students to enhance their learning (L. Earl, 2013). However, this may not apply to all contexts as some teachers do provide indications of strengths and weaknesses.

Assessment for summative purposes may influence learning. When teachers conduct an assessment at the end of a teaching programme, the gathered and interpreted information could be used to improve learning, or the outcome could be used to plan future teaching (Harlen, 2007). However, Wiggins (2016) claims that the feedback for assessment of summative purposes arrives too late (the performance is over).

Teachers could easily get confused with all these assessment terms and purposes, as discussed in section 2.1.5. Hence teachers need the ability to “know the difference between sound and unsound assessments” (Stiggins, 1995, p. 238), where sound assessments are described as meeting appropriate standards, such as assessment purposes, methods used and learning targets (Willis, Adie, & Klenowski, 2013). Hence, it was important to review the research on assessment literacy when investigating teachers’ ‘assessment for learning’ practices.

### **2.1.7 Assessment literacy**

Popham (2011) defines assessment literacy as “an individual’s understanding of the fundamental assessment concepts and procedures deemed likely to influence educational decisions” (p. 267). When educational assessments are appropriately used, students’ learning can be improved (Popham, 2011; Wiliam, 2011). For example, when teachers successfully use assessment to inform teaching, this may well have “unprecedented power to increase student engagement and ... improve learning outcomes” (Wiliam, 2011, p. 11). Likewise, if teachers could improve the pace of students’ learning through assessment, they are more likely to help their students (Popham, 2011). If students were also assessment literate, it is expected that better learning would take place. This section examines teachers’ and students’ assessment literacy.

Popham (2014) believes that there is considerable pressure on teachers to be assessment literate. Even when there are multiple internal and external influences (political, economic, cultural, technological, pedagogical and sociological), it is often teachers who are held responsible for assessment outcomes (Poskitt, 2014).



A commonly encountered problem in many education systems is the lack of assessment literacy among teachers which would enable them to apply authentic assessment (Cumming & Maxwell, 1999; Koh, 2011). Authentic assessment “refers to the assessment of learning that is conducted through real-world tasks requiring students to show their knowledge and skills in meaningful contexts” (Swaffield, 2011, p. 434). It has also been found that due to inadequate support in pre-service education programmes, many teachers are not competent in developing and implementing authentic assessment (Hargreaves, Earl, & Schmidt, 2002; Koh, 2011).

Teacher judgements is another area of concern in assessment (DeLuca, Chavez, & Cao, 2013). Teacher judgements of student achievement have significant influence on students’ experiences and educational trajectories, and can impact teachers’ practices (Meissel, Meyer, Yao, & Rubie-Davies, 2017). Therefore, the ability to accurately judge student outcomes is essential in educational assessment (Südkamp, Kaiser, & Möller, 2013).

According to Meissel et al. (2017), inconsistencies in teacher judgements can be anticipated because there is random error in all assessments of student performance. Bennett, Gottesman, Rock and Cerullo (1993) found that teachers were indirectly affected by their students’ gender when judging the academic skills of 794 kindergarteners from four schools in the United States. Other studies conducted in the United States found that students’ behaviour influenced teachers’ judgements, such as classroom disruption, motivation and students engagement (Dompnier, Pansu, & Bressoux, 2006; Kaiser, Retelsdorf, Südkamp, & Möller, 2013).

A fundamental concept that is closely related to teacher judgement is reliability. Reliability “is often identified as, and measured by, the extent to which, if the assessment were to be repeated, the second result would agree with the first” (Harlen, 2005b, p. 247). To enhance the reliability of teachers’ assessment, Luyten and Dolkar (2010) recommend using detailed specification of criteria, setting up moderation processes through professional collaboration and providing professional development.

The existing recent literature on teacher professional development and communities of practice indicates that teachers' continuing development in the field of assessment is key to enhancing the quality of education (Desimone, 2009; Koh, 2011; Koh, Tan, & Ng, 2012). It is recognised that assessing students' learning is a complex process (Poskitt, 2014), and teachers require in-depth knowledge and understanding of not only the curriculum and pedagogy but also of recent assessment practices (DeLuca & Bellara, 2013; DeLuca & Klinger, 2010; Koh, 2011). Wiliam (2012) argues that changing teachers' daily assessment practices may not be achieved through traditional methods, such as workshops, but by building-based learning communities. However, Willis and colleagues (2013), who consider assessment as "dynamic social practices which are context dependent" (p. 241), believe that acquiring assessment literacy means that teachers must experience a profound change in their assessment beliefs (Fulcher, 2012) where power relations are legitimated and negotiated.

DeLuca and Bellara (2013) and Poskitt (2014) argue that if teachers' assessment literacy is to be improved, there should be an alignment between policy, initial teacher education programmes and professional learning and development. Referring to the United States context and emphasising its 'No Child Left Behind' Act of 2001, Deluca and Klinger (2010) claim that there is an increased emphasis on transparent classroom assessment practices. Nevertheless, there seems to be a mismatch relating to what is intended and what is offered during teacher education (DeLuca & Bellara, 2013; Poskitt, 2014).

Assessment literacy is not only required by teachers but is a must for policymakers, parents, the community (Stiggins, 2014) and students (Popham, 2014). Stiggins (2014) considers that the beliefs about educational testing within the community could be the obstacles to developing assessment competence in schools. However, the type of assessment literacy required by each stakeholder differs.

The ability to use assessment for one's own learning is conceptualised as students' assessment literacy (McDowell, 2010; M. Price et al., 2010; C. D. Smith, Worsfold, Davies, Fisher, & McPhail, 2011). Stiggins (2014) argues that students of all ages

and educational contexts require a good understanding of educational assessment to help them improve their learning. For example, assessment purposes, learning targets, and the difference between good and lousy assessment should be explained to students (Stiggins, 2014).

Assessment knowledge and skills could be developed and achieved through teacher feedback, dialogue, and self- and peer-assessment. Teacher feedback to students is effective only if it assists learners to improve their learning. However, students need to understand how to successfully make use of the feedback (Brookhart, 2011). Advocates of self-assessment argue that students must learn assessment skills as these influence their learning (Cowie, 2005; Dann, 2014). Due to its nature, peer-assessment is viewed as a social process, in which by assessing (reviewing, clarifying and correcting) each other's work, students learn from and with their peers (van Gennip, Segers, & Tillema, 2010). The core requirement for this social interaction is that feedback is given to and received from peers with the aim of enhancing the learning of the group as a whole (Ng, 2016; van Gennip, Segers, & Tillema, 2009).

While referring to the higher education context, several researchers claim that much of the teaching staff time and effort is spent in generating assessment feedback, and in a few cases there has been little attempt to examine its effectiveness (O'Donovan, Price, & Rust, 2001; M. Price et al., 2010). Several research studies in higher education provide evidence that learners desire feedback (Gibbs & Simpson, 2004; McCune, 2004; Zhao, 2010) but may not always understand its benefits (M. Price et al., 2010). However, these studies also suggest that students rarely go through the comments, or for those who do, they might not necessarily understand or use them effectively.

Bloxham and Campbell (2010) argue that teachers should frequently provide oral feedback and have conversations with students. They further suggest that a teacher-student dialogic approach is needed to improve students' assessment literacy. The dialogic approach could be built through existing peer discussion where regular oral feedback is given to help students better understand, for example, assessment purposes and learning targets.

Another facet of student assessment literacy is the ability of students to appraise their own, and their peers' work. Based on the concept of self-regulated learning, several authors recommend three fundamental principles for students to develop their assessment literacy (Pellegrino et al., 2001; C. D. Smith et al., 2011). First, students should understand the purpose of the assessment and link it to their learning journey. Second, they should be aware of the process of assessment. Third, students should have opportunities to judge other students' tasks and know how these could be improved. However, different levels of awareness of assessment should be expected from students of various age groups.

This section highlighted that assessment literacy is a social practice. When involved in this practice, teachers would articulate and negotiate classroom and cultural knowledge with one another as well as their students, and initiate, develop and enact assessment practices to meet specific learning targets (Willis et al., 2013). The section also emphasised that in this practice, students also have to develop the ability to appraise their own and their peers' work to meet their learning targets.

The next section focuses on the distinctive subject area of Technology Education and related assessment practices. The term Design and Technology is preferred for this study, and the rationale for this choice is explained. The subsequent section also elaborates on 'assessment for learning' in D&T.

### **2.1.8 Assessment in Technology Education**

Technology Education in different countries comprises various subjects and titles, such as Technology Education, Technology and Engineering, Design and Technology, Technics, and Technological Education (Rasinen, 2003; Rose, Shunway, Carter, & Brown, 2015). Examples of Technology Education in England and Australia were considered because these countries were among the first to introduce the subject in the school curriculum. Also, Technology Education in these countries contains related components (content taught) to that of the Republic of Mauritius.

In England, Technology Education is referred to as Design and Technology (D&T). The subject D&T includes Cooking and Nutrition and excludes Information and Communication Technology (ICT), which is known as Computing Science since 2012. D&T is taught to 5- to 14-year-olds and is not part of the compulsory national curriculum from age 15 and beyond (Department of Education, 2014).

In Australia, Technology Education consists of ‘Design and Technologies’ and ‘Digital Technologies’, which are considered two distinct but related subjects. In ‘Digital Technologies’, students use information systems and computational thinking which is similar to ICT (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2012, 2013). The subject Design and Technologies includes four technology contexts: engineering principles and systems, materials and technologies specialisations, food and fibre production, and food specialisations. The ‘Design and Technologies’ subject is taught to 5- to 14-year-olds and is an elective subject after the age of 14 (ACARA, 2012, 2013).

The term ‘technology domain’ is used in the Republic of Mauritius to refer to several subjects such as ‘ICT’, ‘D&T’, ‘Home Economics’ and ‘Design, Clothing and Textiles’. The term adopted in this research study is Design and Technology, which excludes ‘ICT’, ‘Food Specialisation’, and ‘Food and Fibre Production’. The term D&T was chosen because this study was conducted in the Republic of Mauritius and it is a standalone subject.

### ***Design and Technology***

England and Wales made D&T a compulsory subject for students (aged 5 to 16 years) in the early 1990s (Banks, 2009). Many countries followed and introduced the subject in their curriculum (Banks, 2009). Even if Technology Education programmes have developed rapidly in countries like Australia, the United States and England (Rasinen, 2003), little progress has been achieved in relation to Technology Education and technology literacy in these countries (Williams, 2014). For example, equal importance was not given to technology literacy as compared to literacy (reading and writing) and numeracy (maths). Countries like China and

India are still progressing towards “developing, trialling and implementing a national technology education curriculum” (Williams, 2014, p. 63).

The goal of Technology Education is to “produce students with a more conceptual understanding of technology and its place in society, who can thus grasp and evaluate new bits of technology that they might never have seen before” (International Technology Education Association, 2000, p. 4). This definition is considered as the aim and a possible outcome of Technology Education (R. A. Brown & Brown, 2010).

The goal of D&T is technology literacy for all (R. A. Brown & Brown, 2010; Moreland, Jones, & Barlex, 2008). Technology literacy “is what every person needs ... to be an informed and contributing citizen for the world of today and tomorrow” (Dugger, Meade, Nichols, & Delany, 2003, p. 10). To develop technological literacy, learners must explore and experience a broad range of technologies in numerous contexts (Moreland et al., 2008).

The D&T curriculum allows students to learn a broad spectrum of technologies. However, students are not only expected to acquire knowledge, skills and understanding in D&T but are also expected to apply this knowledge, skill and understanding to reveal their abilities in the subject (Moreland et al., 2008).

Like in all other curriculum areas, classroom assessment has an important role in D&T. The next section elaborates on assessment in D&T and focuses on authentic assessment activities, planning of goals and activities, and teacher-student interactions.

### ***‘Assessment for learning’ in D&T***

The territory of assessment in D&T is considered more complicated, than many subjects, because of its practice-based nature (Stables, 2015). Assessment in D&T stemmed from two origins—the practical test and the written test (Hanson, 1994; Stables, 2015). The written test developed from an academic tradition, whereas the

practical test resulted from an apprenticeship model where learning is considered to occur through direct experience and mentoring (Fleming, 2013; Stables, 2015).

These two assessment methods have presented conflict and challenges for D&T. Stables (2015) explains that for the written test, knowledge is mostly determined by written words, whereas for the practical test, knowledge is considered to be embedded in the quality of material artefacts. Despite the practice-based nature of D&T, higher status is given to written tests (academic education), and comparatively lower status given to practical tests linked to vocational education (Stables, 2015).

In addition to the challenges posed by the written test, Stables (2015) indicates that classroom assessment practices still follow behaviourist perspectives which conflict with constructivist perspectives (discussed in section 2.2.2). Accordingly, Stables (2015) recommends that assessment approaches that support learning should be adopted to improve assessment practices in D&T. This section considers three elements of assessment that were deemed necessary and contributory to learning in D&T: authentic assessment activities, planning of goals and activities, and teacher-student interactions.

#### *Authentic assessment activities*

Authentic assessment activities are considered to be activities in which learners show “their understanding, skills or abilities in a setting that has some validity to the nature of what is being assessed” (Stables, 2015, p. 132). Stables (2015) takes the example of a footballer (goal-scorer) and claims that if one is willing to assess the goal scoring abilities of the player, then the footballer should be put on the pitch to be assessed in practice, and not solely be assessed through written work.

Two conditions should be met to expose students to authentic technological assessment activities (Fox-Turnbull, 2006; Frey, Schmitt, & Allen, 2012; Stables, 2015; Turnbull, 2002). First, the activities should relate to real-world technology, and second, be contextualised (Fox-Turnbull, 2006; Stables, 2015). When students are involved in real-world technological activities, relevant learning takes place

(Turnbull, 2002). Relevance and motivation serve as dominant traits to improve learning (Fox-Turnbull, 2006). Whereas with unauthentic assessment, students' capacity may not be appropriately developed (Sambell, McDowell, & Montgomery, 2013).

An assessment activity is judged to be real-world at two levels: real to the students' lives and real to situations they may encounter in the future (Fleer & Quinones, 2010; Frey et al., 2012; Stables, 2015; Swaffield, 2011; Turnbull, 2002). Fleer and Quinones (2010) emphasise that the funds of technological knowledge promoted learning. Funds of knowledge mean "historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (Gonzalez, Andrade, Civil, & Moll, 2001, as cited in Fleer & Quinones, 2010, p. 478). Thus, what students gained and brought from their life experiences (authentic experiences) contribute to their learning when linked to assessment activities. However, in some cases, schools and teachers ignore the bodies of knowledge and skills gained outside the classroom. Especially when students come from poor or minority settings, the funds of knowledge are often considered as trivial resources for the classroom setting (Fleer & Quinones, 2010).

Contextualising assessment within students' practice in the classroom is a key factor to improve students' learning in D&T. Fox-Turnbull (2006) conducted research to investigate the setting of assessment and its association to achievement. The study used the same task in two different ways: in-context (embedded within the unit of work reflecting relevant, authentic technological practice) and out-of-context assessment tasks. Fox-Turnbull (2006) argues that out-of-context assessment tasks do not provide accurate indications of students' achievement levels in D&T. With the in-context tasks, students are also more confident in justifying their decision-making, than the out-of-context assessment.

However, implementing in-context tasks is not easy. Total authenticity in D&T is not always possible, especially in the primary school context (Fleer & Quinones, 2010; Fox-Turnbull, 2006; Turnbull, 2002). Very often, the appropriate equipment is not available in schools because it is too costly. Availability of space within the school or classroom to perform such activities may also pose problems. Another



critical issue is the safety of the students. Because several activities have high-risk factors, teachers may avoid authentic technological practice, especially in primary and early secondary school contexts. Fler and Quinones (2010) contend that models could be used as a way to approach authentic assessment practices.

### *Planning of goals and activities*

One way for technology teachers to identify what they need to teach is through the articulation of clear goals that students can understand and achieve (Spendlove, 2015). The SMART (specific, measurable, attainable, realistic and time-oriented) goal-setting process helps teachers ensure that the goals are within reasonable limits (Lydotta & Fratto, 2012). Technology goals could be grouped into conceptual, societal, technical and procedural categories, and be translated into students' language (Moreland et al., 2008). Then, it is arguably easier for teachers to determine how their students might progress towards targeted goals to enable relevant learning (Fox-Turnbull, 2015).

Several research studies suggest that teachers need to identify and plan both specific and overall technology learning outcomes to improve students' learning (Jones & Moreland, 2004; Moreland, Cowie, & Jones, 2007; Moreland et al., 2008). Potgieter (2012) conducted a research study in South Africa where 564 D&T lesson plans were analysed. In these lesson plans, teachers were required to use the learning outcomes and assessment standards stated in the National Curriculum for preparing assessment activities. Even when the learning outcomes were stated explicitly in the policy document, Potgieter (2012) reported that the teachers found it challenging to align the outcomes with the assessment activities. According to Potgieter (2012), in only 52.93% of the cases, the items were entirely associated with what was specified in the National Curriculum.

When planning activities, if teachers are unclear about technological ideas and processes, Moreland et al. (2008) warn that their interactions with students may not focus on technology. Instead, during their interaction, teachers would emphasise praising students with regard to task completion and other skills (Jones & Moreland, 2004). To interact more efficiently and confidently, Moreland et al. (2008) propose

that teachers should become more aware of the demands of assessment activities through rehearsals, which would also indicate potential problems. Also, it would ascertain the technological knowledge and skills required by teachers for the activities. For example, a teacher might predict if the allocated amount of material for a distinct project would be appropriate or not.

### *Teacher-student interactions*

Classroom dialogue is fundamental when teachers use ‘assessment for learning’ in teaching D&T. Moreland et al. (2008) suggest that students should be provided with opportunities to express themselves, discuss and debate their ideas with peers and the teacher. For example, when exploring technological ideas, it is through the designing and talking that students start realising what they know, what they can do, how well they know and how well they can do a particular activity (Moreland et al., 2008). For effective learning to take place, classroom talk should be rich enough for learners to reveal their concerns and ideas (Moreland et al., 2008).

It is by listening and interacting with the students that teachers should provide effective feedback and suggest ways of improvement. Feedback means providing students with information about their learning. Moreland et al. (2008) suggest that detailed feedback through comments, associated with students’ actual achievements or competencies, is vital to improve their learning. In D&T, teachers need to provide learners with information (descriptive feedback) that aids the learners realise how well they are doing, what they might do next and how they might get there.

Apart from identifying strengths, weaknesses and the next learning steps, feedback should also focus on negotiating learning goals and expectations. During the implementation of the lesson and when conducting assessment, as learners became self-reflective about their learning progress and based on their needs, the learning intentions could require modifications (Compton & Harwood, 2003; Moreland et al., 2008). Therefore, a re-alignment of the learning intentions would be required to enable students to progress.

The first section of this chapter examined the extant literature related to the purposes of assessment and some current issues in educational assessment. This section also focused on ‘assessment for learning’, Technology Education and ‘assessment for learning’ in D&T.

The following section analyses the theoretical framework that informs the study. There are several implications for teaching, learning and assessment based on the learning theories that D&T teachers adopt when enacting ‘assessment for learning’. Each school of thought on learning has different viewpoints on how students learn. The next section briefly explains several consequences under two main approaches to learning related to this study: instructivism and constructivism.

## **2.2 Theoretical Underpinnings**

This section has three main parts. The first part makes a comparison of instructivism and constructivism by highlighting the fundamental philosophical and practical differences between the two. The second part provides an analysis of constructivism and social constructivism. A review of instructivism, constructivism and social constructivism was necessary because these perspectives shape teachers’ practices (including ‘assessment for learning’ practices). The third part introduces three theories—Bourdieu’s notion of habitus, Foucault’s theory around the effects of the power-knowledge relationship, and Bronfenbrenner’s ecological systems model—to provide a theoretical framework to explain the effect of context on teachers’ ‘assessment for learning’ practices.

### **2.2.1 Instructivism and constructivism**

It might not be appropriate to reduce all learning theories to two categories; however, Porcaro (2011) suggests that it is helpful to consider instructivism and constructivism as two poles on a continuum. Comparing the two types at a macro level could aid understanding of the current discourses on learning. Sfard (1998) uses the terms ‘acquisition’ to describe the instructivism end and ‘participation’ to refer to the constructivism end of the continuum. Instructivists consider that knowledge is absolute and is given by the teacher (Merrill, 2008; Nagowah & Nagowah, 2009; Porcaro, 2011; Woollard, 2010). In contrast, constructivists

believe that knowledge is not the same for all learners and is constructed in many different ways (Lave & Wenger, 1991; Porcaro, 2011; Schunk, 2008).

There are different philosophies within the instructivism and constructivism perspectives, leading to a range of pedagogical methods, which are summarised in Table 2.2 that was adapted from Porcaro's (2011) work. Assessment procedures within the various philosophies also differ.

Table 2.2 *Elements of Instructivism and Constructivism*

	Instructivism		Constructivism	
	Behaviourism	Cognitivism	Cognitive constructivism	Sociocultural constructivism
<b>Philosophy</b>				
History	Skinner, Thorndike	Information processing theorists	Piaget, constructionism	Vygotsky, social practice theories
Learning theory	Stimuli, response, feedback; changes in behaviour	Prior knowledge, sensory, short-term (working) and long-term memory; change states (long-term memory); use of schema in novel situations	Engagement with others, through conflict to construct personal meaning	Constructing intersubjective meaning in the Zone of Proximal Development with more knowledgeable peers
<b>Pedagogy</b>				
Learning goals	Mapping the structure of the world onto the learner; effective and efficient knowledge transfer		Creating elaborations and interpreting knowledge	Flexible thinking skills and the domain practices for lifelong learning
Teacher's role	Centre of Instruction; Control instruction process and content		Ranges from minimally guided to facilitator;	Facilitator; Tutor; Mentor
Learner's role	Recipient of teacher's instruction		Active constructor of knowledge and centre of learning environment	Centre of learning and participant in community of practice
Assessment	Individual		Multiple goals; Authentic context assessment	Multiple goals; Authentic context assessment

*Note.* Adapted with permission from "Applying constructivism in instructivist learning cultures," by D. Porcaro, 2011, *Multicultural Education & Technology Journal*, 5(1), p. 42. Copyright 2011 by Emerald.

Instructivists assume that the instructivism perspective has two branches: behaviourism and cognitivism. From the early 20<sup>th</sup> century until the mid-1970s, behaviourism was influential in education (Porcaro, 2011). This influence stems from the writing of John Locke (1632–1704) (Jost & Sidanius, 2004) and was developed in the work of Pavlov (classical conditioning), Thorndike (law of effect) and Skinner (operant conditioning) (Bryant, Vincent, Shaqlaih, & Moss, 2013; Woollard, 2010). Behaviourism stresses learners' behaviour and the change in behaviour that follows when learning occurs (Woollard, 2010). Behaviourists believe that behaviours are observable and measurable, and that change in behaviour is due to an individual's interaction with the environment (Bryant et al., 2013).

Cognitivism gained credence in the mid-20<sup>th</sup> century (Schunk, 2008). Cognitivists consider an individual's mind to process information is similar to a computer, whereby knowledge is stored in the memory in an organised, meaningful way (Porcaro, 2011; Schunk, 2008). The information processing theory stems from the work of Miller (chunking) and developed over the years through the work of Atkinson and Shrifin (stage theory), Craik and Lockhart (levels of processing), and Rumelhart and McClelland (connectionist model) (Elman, 2005; McLeod, 2007, 2009).

The instructivism perspective assumes that the curriculum should be specified in detail, and the teachers' role is to transmit the prescribed content to learners. Teaching (instruction) is viewed as the transfer of knowledge to students who passively receive information (Charles, 2014; Gipps, 1999; Porcaro, 2011; Pritchard, 2005). Assessment is considered as the process of verifying whether the students received the transferred information, and can recall what they learned (Leonard, 2002). The features of instructivism indicate that this perspective corresponds to Schiro's (2013) scholar academic ideology, which is further discussed in section 3.1.2.

On the other hand, constructivism assumes that learners have prior knowledge and experiences. In this perspective, learners are not expected to process facts, but to

explain and interpret the information as they construct new knowledge (Leonard, 2002; Porcaro, 2011).

Constructivism has two branches (see Table 2.2)—cognitive constructivism and sociocultural constructivism. The cognitive constructivism perspective, inspired in large measure by the work of Piaget, is closely associated to cognitivism (Porcaro, 2011). From Piaget’s perspective, learners still process objective reality in the mind (Porcaro, 2011), but they “actively construct their ways of knowing as they strive to be effective by restoring coherence to the worlds of their personal experience” (Cobb, 2005, p. 39). This perspective supports that there are differences amongst students’ understandings developed in instructional situations and their understandings will be different from what the teacher intended (Cobb, 2005). In contrast, the theoretical basis of sociocultural constructivism, based on the work of Vygotsky, Leont’ev, and Davydov and others, assumes that learning is a process of enculturation into a community of practice (Cobb, 2005). The notion of a community of practice is discussed further in section 2.2.3.

Unlike instructivists, constructivists consider teaching as an intervention in an ongoing knowledge construction process (Gipps, 1999; Leonard, 2002; Porcaro, 2011; Pritchard, 2005; Schunk, 2008) with the learners at the centre of the learning environment and actively participating in the construction of knowledge. Assessment in the constructivism framework follows a continuous and ongoing process, and methods such as authentic assessment, performance assessment, and portfolio assessment are used (Porcaro, 2011).

The next section elaborates on the main assessment types, in relation to instructivist and constructivist perspectives, referred to as static and dynamic assessment.

### ***Static and dynamic assessment***

The literature identified two fundamental perspectives of assessment: static and dynamic (Baharloo, 2013; Lunt, 1994). The characteristics of static assessment (also referred to as traditional assessment) relate to assessment that is developed

from an instructivist perspective, while the features of dynamic assessment relate to the constructivist perspective.

Static and dynamic assessment are considered to differ in two ways (Burton & Watkins, 2007; Lunt, 1994). First, regarding test procedures (test situations) and second, relating to the nature of what is investigated (the process of learning compared to the product of learning).

In static assessment procedures, interactions between the teacher and the students are not allowed. The teacher is expected to observe and record students' responses and interpret them as results. The learners are isolated from their peers and placed in an unfamiliar situation and expected to depend on their current experiences for their responses (for example, cognitive, metacognitive and affective) (Baharloo, 2013; Lunt, 1994). Responses constructed in a one-off static assessment are presumed to be representative of the learner's ability (Jafary, Nordin, & Mohajeri, 2012).

In comparison, dynamic assessment is grounded in the belief that the teacher can understand students' cognitive development better by interacting with them rather than assessing their unassisted performances (Lauchlan & Carrigan, 2013). During the interactions, the teacher explores students' learning, thinking processes and teaching methods that might enhance and extend students' learning (Haywood, 2012). Also, students are allowed to ask questions and contribute to the assessment (Lauchlan & Carrigan, 2013).

The second distinction between static and dynamic is the nature and purpose of the two assessments. The static forms of assessment usually follow instruction and focus on the product of learning (Baharloo, 2013; Lauchlan & Carrigan, 2013; Lunt, 1994). The traditional forms of assessment emphasise what learners already know and what they can do on their own (Lunt, 1994), and are not intended to improve learning (Baharloo, 2013). All students receive the same assessment (activity/test) at a particular moment in the teaching sequence and are required to perform the task under the same conditions (e.g., time and guidelines).

In contrast, dynamic assessment is an approach derived from Vygotsky's (1978) sociocultural theory, which focuses on the process of learning (Lantolf & Poehner, 2008; Lauchlan & Carrigan, 2013; Poehner & Lantolf, 2005). Instead of focusing on what students have already learnt, teachers focus on how and what students learn (Lauchlan & Carrigan, 2013). Also, teachers provide feedback on students' learning, such as how correct and incorrect the responses are, and how these can be improved.

The dynamic assessment is also termed "mediated assessment" (Caffrey, Fuchs, & Fuchs, 2008, p. 254). This concept was related to Vygotsky's work on the zone of proximal development and the role of the adult or a more experienced peer in mediating understanding (Lauchlan & Carrigan, 2013).

The next section further elaborates on constructivism because 'assessment for learning' seems to follow the procedures of dynamic assessment.

### **2.2.2 Constructivism and social constructivism**

After considering a range of theoretical possibilities, constructivism was identified as an appropriate paradigm within which to frame this research. Constructivism was preferred (Black, 2001; Shepard, 2000) because it aligned with the key principles of assessment (see section 2.1.6). Notions of constructivism provide a robust framework for understanding the 'assessment for learning' practices of teachers (Cowie & Moreland, 2015; Crossouard, 2009; Ellery, 2008; Hickey, 2015). Also, in a subject like D&T, students construct meaning and experiment with phenomena, by interacting with other individuals and the environment (Banks, 2009; Fox-Turnbull, 2015).

This section begins by providing a brief overview of constructivism. Vygotsky's (1978) social constructivist theory is then described in depth, followed by a discussion of the key tenets of the sociocultural view of learning: situated learning, distributed cognition and mediated action.



## ***Constructivism***

Constructivism is a philosophical explanation suggesting that people construct their meaning of the world around them (and much of their learning) through a process of interpretation (Applefield, Huber, & Moallem, 2000; Banks, 2009; Schunk, 2008). For example, a student always comes into class with prior knowledge, beliefs and experiences (Banks, 2009).

From a constructivist view of learning, students actively construct rather than acquire knowledge. Knowledge is constructed by students based on their beliefs and experiences, and not imposed from the outside by others (such as a teacher). This suggests that all knowledge is subjective and personal (Schunk, 2008).

Knowledge is constructed when a learner finds coherence in the new knowledge, makes meaning from it and calibrates it with their existing knowledge conception (Gipps, 1999). In an attempt to make meaning, the learner is actively and deeply involved in processing the material to be learnt, for example, considering available relevant information, harmonising it with their existing knowledge and mentally arranging them into logical structures (Mayer, 2003).

Moshman (1982) has identified three main perspectives of constructivism: exogenous, endogenous and dialectical. The exogenous perspective suggests that the outer world strongly influences the construction of knowledge, for example, through teaching and experiences (Schunk, 2008). The endogenous perspective considers that construction of knowledge is not influenced by teaching, social interaction and experiences from the external world, but instead, individuals are the creator of their knowledge, which is based on their existing mental schema (Applefield et al., 2000; Bruning, Schraw, & Norby, 2011). The dialectical perspective considers that knowledge is mutually built through interactions between people (social) and their environments (Schreiber & Valle, 2013; Schunk, 2008). For example, when assessment is conducted, there would be debating, comparing and sharing of ideas between the teacher and learners, and learners would also refine their understanding and help others in finding meaning. Applefield et al. (2000)

argue that if teachers understand these three constructivist concepts, they are able to better support students' learning through assessment.

Piaget's (1953) theory of cognitive development has a few similar elements to the endogenous framework, while Vygotsky's (1978) theory of cognitive development is more related to the dialectical framework (Schunk, 2008). The two kinds of constructivism—Piaget's cognitive constructivism and Vygotsky's social constructivism—have significantly influenced the methods and approaches of teaching, learning and assessment over recent decades (Gipps, 1999; Porcaro, 2011; Schreiber & Valle, 2013).

### ***Cognitive and social constructivism***

The cognitive and social constructivism theories propose that learners construct their own ideas and understanding of what is taught. Piaget's (1953) theory emphasises an individual's ability to interpret knowledge, while Vygotsky's (1978) theory highlights how social interaction, culture and language affect the individual's construction of knowledge (Porcaro, 2011; Powell & Kalina, 2009).

The notion of cognitive constructivism is based primarily on Piaget's (1953) work, and the underlying principle is that students construct their own reality (Porcaro, 2011; Powell & Kalina, 2009). This theory suggests that humans cannot immediately understand and use materials (information) when provided to them, but they need to construct their knowledge (Powell & Kalina, 2009) and it is shaped and organised by their experiences (Pelech & Pieper, 2010). When new experiences and situations are encountered, an individual links the new experiences with the former knowledge bases, and, subsequently, the new knowledge is not only added to the original knowledge base but also causes it to be restructured (Pelech & Pieper, 2010).

Piaget (1953) proposed a stage theory model and stated that a person's schemas were constructed through continuous action of assimilation and accommodation (Gipps, 1999; Powell & Kalina, 2009). The process of assimilation and accommodation is a search for balance, and this interplay results in equilibration

(Barker, 2008; Bell, 2005; Palincsar, 1998; Powell & Kalina, 2009). Assimilation occurs when an individual introduces new knowledge to their existing mental schemas (Gauvain, 2001). If the incoming information cannot be understood by the individual's existing mental schemas, accommodation takes place; that is when a person has to modify their mental structure to accommodate the new knowledge (Bell, 2005; Powell & Kalina, 2009).

Piaget's theory of constructivism recognises that the equilibration process takes place at different rates for different people (Powell & Kalina, 2009). For example, some students can grasp concepts fast, while others may struggle and take longer, depending on their prior experiences. This equilibration process also applies when students are assessed.

According to Gauvain (2001), both Piaget and Vygotsky acknowledge that social experience contributes towards cognitive development. However, a substantial difference exists between their views. In Piaget's (1959) view, the main stimulus of cognitive growth is disequilibrium: the difference between what a learner knows and what information is presented to the learner in a social setting. According to Piaget (1959), collaboration involving partners (who engage in cognitive conflict) is conducive to cognitive development, on the basis that peers are close in their understanding but not identical (a symmetrical relationship). Piaget contrasts the symmetrical with asymmetrical interaction, that is, relationship with peers of different social and cognitive positions. Interestingly, Piaget's approach to constructivism has been criticised, due to the lack of emphasis on social interaction, despite this focus on the usefulness of peer learning (Bell, 2005; O'Loughlin, 1992).

On the contrary, Vygotsky laid more emphasis on asymmetrical relationships (Gauvain, 2001). Developed by Vygotsky in the early part of last century, the concept of social constructivism emphasised collaborative learning environments and social interactions (Barker, 2008; Powell & Kalina, 2009). Vygotsky (1978) claimed that creating meaning through interactions and learning is a social activity; "human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them" (p. 88).

One of the fundamental concepts of Vygotsky's (1978) theory is the zone of proximal development, which highlights how people learn from one another (Pishghadam & Ghadiri, 2011). The zone of proximal development is defined as "the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). In this zone, learning of concepts and skills that cannot be mastered by oneself occurs when help from people with a level of expertise beyond that of the learner is received, such as advanced peers or teachers (Powell & Kalina, 2009; Schreiber & Valle, 2013; Schunk, 2008). Teachers operate as facilitators of learning when conducting 'assessment for learning', as opposed to being "the sage on the stage" (Schreiber & Valle, 2013, p. 397).

From the sociocultural perspective of learning, there has been significant theorising on learning with regard to both the individual and social features (Bell, 2005). Sociocultural theory can be traced back to the work of Vygotsky from early in the 20<sup>th</sup> century (Nasir & Hand, 2006; Rogoff, 2003; Wang, Bruce, & Hughes, 2011; Wertsch, 1991). Vygotsky argued that in all communities, children are cultural participants (Rogoff, 2003) in which the social and cultural processes are considered to be the mediators of human activities and thoughts (Nasir & Hand, 2006; Rogoff, 2003). Sociocultural theories were developed further by neo-Vygotskians, such as Lave and Wenger (1991), Rogoff (2003) and Wertsch (1991), who elaborated on the theories underpinning learning as a socially mediated process.

This research study is focused on teachers' 'assessment for learning' practices in D&T. Considering that the main purpose of 'assessment for learning' is to improve and support students' learning, three sociocultural concepts of learning were considered significant: situated learning, distributed cognition and mediated action.

Situated learning involves knowledge construction taking place in a social setting where people interact with one another, the environment, the culture and the content of the task (Stein, 2001). It is through the process of social interaction that learning takes place, through a co-constructivist framework, and not individually (Bell, 2005; Pitri, 2004). Learning is considered "an integral and inseparable aspect of the social

practice” (Bell, 2005, p. 45) with the learner moving “towards full participation in the sociocultural practice of the community” (Lave & Wenger, 1991, p. 29).

Learning is considered not to take place through teaching only but through the level of students’ involvement in a community of practice (Lave, 1996; Nuthall, 2002). Students’ participation intensity is based on several factors, such as, their past and present involvement in communities and their future aspirations (Pitri, 2004). Taking the example of wearing safety glasses, Pitri (2004) elaborates that teachers could teach (through transmission) and students demonstrate their understanding of the concept by passing a quiz. However, once these learners are back in their workstations (community), wearing safety glasses might not be vital to them. This scenario indicates that the community of practice of these learners might not share the same meaning of wearing safety glasses. What learners learned in the classroom might have no relevance or meaning for many of them; students might have learned the information only to pass the assessment. However, several learners could decide to wear the protective glasses, perhaps through their experiences within another culture (Pitri, 2004).

A situated learning perspective assumes that all learning is situated and is an integral part of the social and physical settings in which it takes place (Lave & Wenger, 1991; Stein, 2001). Anderson, Redera, and Simon (1996) disagree that “all knowledge is specific to the situation in which the task is performed and that more general knowledge cannot and will not transfer to real-world situations” (p. 6) when comparing a classroom and a real-life situation. Lave and Wenger (1991) argue that general knowledge is like other kinds of knowledge, which is gained in specific circumstances and should be used in specific circumstances. Lave and Wenger (1991) add that “the generality of any form of knowledge always lies in the power to renegotiate the meaning of the past and future in constructing the meaning of the present circumstances” (p.34).

Another notion of the sociocultural perspective of learning is the approach of distributed cognition (Hutchins, 1991), which views cognition as a distributed phenomenon, in contrast to the traditional view which considers it to be localised (Rogers, 1997). The sociocultural perspective views cognition as distributed across

the setting within which it takes place (Bell, 2005). Pea (1997) argues that “the mind rarely works alone [,] intelligences ... are distributed ... across minds, persons, and the symbolic and physical environments, both natural and artificial” (p. 47).

Pea (1997) proposes that there are two dimensions to cognitive (intelligence) distribution: the social and material. Social intelligence emerges from social activities where people collaboratively work in a team to achieve shared aims, or joint action-guided participation, such as an apprenticeship. Material intelligence originates when resources from the environment or “exploitation of the affordances of designed art[e]facts” (Pea, 1997, p. 50) contribute to support the success of an activity’s purpose. For example, in a group assessment, students think in partnership about the idea (the social) and make use of materials as support, such as languages, maps, and tools like laptops.

A third fundamental sociocultural view to understanding how the social, cultural and material environment restructures the mental functioning of the individual is through mediated actions (Otero, 2004; Poehner & Lantolf, 2005). Mediated action is “a human action that employs mediational means” (Bell, 2005, p. 48). There are two types of mediational means (cultural tools): material (technical tools) and conceptual (psychological tools). The technical tools include computers, pencils, set squares and machines, while the psychological tools are symbolic artefacts that include styles of talking, languages, rituals and signs (Bell, 2005; Cole, 1998; Kozulin, 2003; Zimmerman & Bell, 2012).

The mediational means available are accepted differently by individual learners to “create unique cultural toolkits” (Zimmerman & Bell, 2012, p. 227). Individuals may then use their toolkits in varying structures to deal with different types of problems that they encounter (Swidler, 1986). Since individuals can construct different strategies of action, it also means that they can select amongst specific psychological tools, such as styles and beliefs.

Mediated action is described as a process where the environmental stimuli are filtered through mediators, commonly adults or more competent peers. Instead of directly influencing the learner, the stimuli are filtered by the mediators who select,

frame, modify and impose order on the stimuli (Poehner & Lantolf, 2005). For example, when implementing classroom assessment, the teacher (mediator) may influence learners by prompting them to think critically.

From the perspectives of situated learning, distributed cognition and mediated learning, ‘assessment for learning’ should satisfy three criteria. First, it is an integral part of the physical and social contexts in which it takes place. Second, it includes social activities where students work collaboratively. Third, it involves mediators (teachers) to prompt learners to think critically. For students to truly participate in the construction of knowledge and understand the requirements of the ‘assessment for learning’ process, they should be actively and comprehensively involved in the process (Rust, O’Donovan, & Price, 2005).

Having discussed the primary overarching theoretical framework for this study, the following section presents some complementary theories, which help to explain the contextual influences on teachers and assessment.

### **2.2.3 Theoretical explanations for the influence of context**

All practices are influenced by context (McCormack et al., 2002). ‘Assessment for learning’ practices can also be affected by teachers’ beliefs about teaching and learning, classroom realities, external factors (e.g., political and societal), teachers’ experiences and teachers’ preparedness to apply their assessment knowledge and skills (Costa & Murphy, 2015; D. I. Cross & Hong, 2012; Mills, 2004; Remesal, 2011). Three theoretical concepts are explored to understand the contextual factors potentially related to this study. These include: Bourdieu’s concept of habitus (Bourdieu, 1977); Foucault’s explanations of power-knowledge relationships (Foucault, 1980); and Bronfenbrenner’s ecological systems model for explaining the interconnectedness of relationships (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). These three concepts are briefly explored next.

#### ***Bourdieu’s habitus concept***

The habitus concept, used in a range of disciplines, including education, is probably the most cited of Bourdieu’s (1977) concepts (Costa & Murphy, 2015; Maton,

2008). Adopting Bourdieu's notion of habitus as a lens in this research enables a holistic understanding of the participants and their explanations of their social practices (Geertz, 1973; Serrant-Green, 2007). The habitus lens helps investigators explain "how and why social agents conceive and (re)construct the social world in which they are inserted" (Nowicka, 2015, p. 3).

Habitus focuses on how individuals act, speak, feel, think and exist (Bourdieu, 1977; Joas & Knöbl, 2011; Maton, 2008). Habitus describes how social agents (such as teachers) use their histories within themselves, and how these histories are brought into the present to give meaning to new experiences (Hilgers, 2009; Maton, 2008). Agents then make choices in specific situations, which are the outcomes of numerous past events that shape their visions. Therefore, the structure of habitus is not fixed but evolves. According to Harker (1984), "schools operate within the constraints of a particular habitus" (p. 122). Therefore, habitus is considered to influence the way in which teachers may interact with and interpret the curriculum and assessment at national and school levels.

Bourdieu's notion of the social sphere was developed as part of a means of examining human activity (Thomson, 2008). Each of the interdependent and co-constructed trio (field, capital and habitus) are fundamental to understanding the social world and can be best understood through case-by-case deconstruction. Concepts associated with Bourdieu's habitus concept discussed in this section include field, forms of capitals, autonomy of agents, sense of the game, and logic of practice. Bourdieu (1993) claims that an individual can also move from one field to another. According to Thomson (2008), it is essential exploring the social space in which the events, interactions and transactions occur if one intends to understand interactions between individuals or to explain a social phenomenon.

For Bourdieu, a field is a competitive space (W. Smith, 2012). At stake, in this competition, is the accumulation of various forms of capital (e.g., social, economic and cultural) (Moore, 2008). Social agents, beginning with particular forms of capital, are privileged at the outset and capable of using their capital advantages to add more forms of capital (forms of knowledge, assets and affiliations), advance



further than others and be more successful (Thomson, 2008). Individuals use varying approaches for preserving and upgrading their position (Bourdieu, 1985).

The social field is hierarchically structured in which various forms of power circulate (Naidoo, 2004). The agents occupy dominant and subordinate positions and have competing and complementary relationships (Thomson, 2008). These positions are mainly determined based on the cultural or social resources each agent possesses (Naidoo, 2004). Those in dominant positions have decision-making powers to influence the nature of a field (W. Smith, 2012).

Bourdieu (2005) explains that similar social spaces operate in a similar pattern. For example, secondary schools can be expected to have the same hierarchical structure and common operation patterns, such as the implementation of assessment practices. This notion of similar patterns might be helpful to understand teachers' assessment practices in secondary schools.

Nevertheless, according to Bourdieu (2005), some variations are both possible and necessary. One possible cause of variations could be the agent's position within the social space, which is defined by the positions occupied in different fields or subfields (Bourdieu, 1985). This notion of variations might also be useful to understand adaptations in teachers' assessment practices.

The term 'capital' is regularly associated with monetary exchange, but Bourdieu's interpretation is broader (Moore, 2008). Three general forms of capital are posited by Bourdieu (1986): economic, cultural and social.

Economic capital relates to wealth, such as money and assets (Bourdieu, 1986; James, 2011). Wealth is essential in education and directly influences teaching, assessment and learning based on the quality of resources, facilities and infrastructure available to teachers. In subjects like Technology Education, authentic assessment activities given to students are expected to be set as close as practicable to real technological practice (Fox-Turnbull, 2006). Lack of economic capital could therefore influence teachers' practices and outcomes for students.

Bourdieu claims that economic capital “is at the root of all the other types of capital” (1986, p. 5).

Cultural capital refers to non-financial properties identifying an individual’s status within a social space (James, 2011; Reed-Danahay, 2005). Cultural capital is the outcome of a person’s engagement with and in education and culture (Grenfell, 2014). Examples of cultural capital include knowledge, culture and previous work experiences (DiGiorgio, 2010; Roksa & Robinson, 2016), including experiences gained when implementing ‘assessment for learning’.

Grenfell (2009) explains that social capital includes features of social life, such as trust, norms and networks, that are useful resources for agents in their social relationships. The bulk of social capital owned by an agent is thus determined by the size of the agent’s network of connections. The social capital is symbolic, and acts as a multiplier for enhancing other forms of capital (Bourdieu, 1986). Examples of networks include the workplace and associations with prestigious groups.

The field is key to Bourdieu’s “relational approach, and autonomy its keystone” (Maton, 2004, p. 688). Bourdieu (1977) asserts that agents’ choice of actions within the field is governed by prior experiences such as childhood, family and school life. However, with growth and social influences, “the parameters of people’s sense of agency and possibility” are shaped (Edgerton & Roberts, 2014, p. 195; Joas & Knöbl, 2011). Sterne (2003) argues that changes or adaptations in approaches might occur when individuals are interested. Therefore, a Bourdieusian approach can provide insights into teachers’ choices and interest in adopting new assessment approaches.

Bourdieu considered and discussed social life as a game. For Bourdieu, the social field is like a game field with social agents (individuals or institutions) occupying different positions (Thomson, 2008). The various positions held by the agents in the social space are limited by boundaries, which constrain what can be done. The field conditions also control or shape what agents can do (Maton, 2008). The notion of sense of game can offer meaningful insights into how teachers’ assessment practices are shaped within their social field.

According to Bourdieu (1992), the nature of fields is determined by a logic of practice. Each field has its separate logic of practice that exists in its own rights (Naidoo, 2004). It is not the physical properties or institutional structure that defines the boundaries between fields, but the internal logic that informs the practices (W. Smith, 2012). The field (education or school or department) boundaries are defined and re-defined by the actions of individuals and groups within the field or by agents with institutional power to influence the field from beyond their borders (Bourdieu, 1990). The notion of logic of practice signifies another means that could influence teachers' 'assessment for learning' practices.

### ***Foucault's power-knowledge concept***

Drawing on Foucault's (1977) writing on power structure and discipline, it can be argued that teachers' practices are shaped by various factors (Palm, 2014). Accordingly, Foucault's explanations of the power-knowledge relationship provide a rich conceptual apparatus for understanding and interpreting teachers' practices. For this reason, the concepts of disciplinary power, resistance and freedom, discourse, and games of truth were explored to gain insights of teachers' 'assessment for learning' practices.

Foucault claims that disciplinary power does not involve a mass or group but individuals (Foucault, 2006; Hoffman, 2014; Simons, 2013; C. Taylor, 2014). Even if power is exercised over a group of people, it is directed at separate individuals. Disciplinary power makes individuals "its objects, objectives and instruments" (Hoffman, 2014, p. 28) without requiring force or coercion, but through rules and regulations. Since disciplinary power permeates and drives daily practices, this concept is helpful for explaining teachers' assessment practices.

Foucault (1977) claims that disciplinary power attempts to make the body more obedient. Obedience is achieved by undertaking precise, continuous and exhaustive control of the body's activities (Hoffman, 2014), attributed to three key instruments: hierarchical observation, normalising judgement and examination (Bowdridge & Blenkinsop, 2011; Foucault, 1977).

The technique of hierarchical observation involves a mechanism of surveillance, often through unseen forces. Hierarchical observation serves to act on the individuals' actions, provides a hold on their conduct, and alters their behaviours (Foucault, 1977). This mechanism of control also exists in schools, and Hill (2009) suggests that hierarchical observation instrument would be useful for understanding how teachers frame their assessment practices.

The concept of normalising judgement is where disciplinary power is used to judge individuals based on norms (Feder, 2014; Foucault, 1977; Hoffman, 2014). Foucault (1977) portrays the norm as a standard of performance, thus allowing the measurement of forms of performance as either "normal or abnormal" (Hoffman, 2014, p. 32). Through normalisation, individuals understand what is qualified as normal behaviour or performance in their society or institutions. Thus, institutions establish structures that not only individualise and create docile bodies, but prescribe what is recognised as acceptable (Bowdridge & Blenkinsop, 2011). For this reason, this Foucauldian notion of normalising judgement offers insights on teachers' normalised assessment practices (Hill, 2009).

Examination can be seen as the Foucauldian techniques of disciplinary power, which is a combination of hierarchical observation and normalising judgement (Bowdridge & Blenkinsop, 2011; Foucault, 1977; Hoffman, 2014). Foucault (1977) claims that examination is a "normalising gaze" (p. 184). An example of the 'normalising gaze' could be a national standardised test. The notion of examination positions the bodies within a system and reminds the concerned individuals that they are under observation. Docile bodies are created through "pressures to measure up to peers and through apprehensions created as to the potential ramifications of any results, particularly poor ones" (Bowdridge & Blenkinsop, 2011, p. 157). Power relations within institutions, such as schools, are not restricted to actions within them but also by what goes on in its wider environment (Foucault, 1977) or system. Hence, Foucault's examination notion is useful for examining teachers' practices (Hargreaves, 1989; Hill, 2009).

Foucault (1978) recognised that “where there is power, there is resistance” (p. 95) and considered resistance as a reverse power (Thompson, 2003). Power and resistance exist in an equally constitutive relationship (Foucault, 1989; Reed-Danahay, 2005), with the two concepts interconnected and intertwined (Lilja & Vinthagen, 2014; Sharp, Routledge, & Paddison, 2005).

Like resistance, Foucault (1982) claims that freedom and power cannot be separated. Power is “exercised only over free subjects” (Foucault, 1982, p. 790), implying that the subjects have choices. The subjects, whether individual or collective, can adopt several behaviours and reactions. Freedom, or what Lilja and Vinthagen (2014) refer to as “self-reflexiveness” (p. 112), permits subjects to resist, discipline or subjugate themselves in line with the current norms. As such, the Foucauldian resistance (Pryor & Crossouard, 2008) and freedom concepts offer valuable resources for understanding teachers’ assessment practices.

Foucault considered power and knowledge as inseparable (Feder, 2014). ‘Knowledge’, for Foucault, is a matter of historical, social and political conditions under which, for instance, statements are counted as true or false (McHoul & Grace, 1998). The term ‘knowledge’ is more or less synonymous with the term ‘discourse’ (Burr, 1995) where discourse reflects society’s structures and ways in which the society is managed (McHoul & Grace, 1998).

For Foucault (2002), discourse is “sometimes as the general domain of all statements, sometimes as an individualizable group of statements, and sometimes as a regulated practice that accounts for a certain number of statements” (p. 90). ‘Statements’ imply real practices in selected locations at a given moment (Danaher, Schirato, & Webb, 2000; Markula & Pringle, 2006), whereby “meanings, subjects and subjectivities are formed” (Wright, 2004, p. 20). Hence, as suggested by Palm (2014), and Pryor and Crossouard (2008), Foucault’s concept of discourse offers potential to understand teachers’ assessment practices.

Foucault uses the term ‘games of truth’ to emphasise that truth is dependent on institutional and discursive practices (Danaher et al., 2000; Pryor & Crossouard, 2008). ‘Games of truth’ are considered important as they discursively position us

to perceive the truth about our desires and experiences (Danaher et al., 2000). Foucault's concept of 'games of truth' clarifies how agents (teachers) create and recreate identity and subjectivity based on the 'games of truth' that they opt to engage in (Stirling & Percy, 2005). For Pryor and Crossouard (2008), the Foucauldian 'games of truth' concept is valuable for understanding the cultural norms that shape assessment practices.

### ***Bronfenbrenner's ecological model***

Bronfenbrenner's ecological model refers to an individual's growth and development, which is shaped by direct and indirect sociocultural influences (Bronfenbrenner, 1979; Harms, 2005; Mligo, 2015; Tissington, 2008). Bronfenbrenner's work considers an individual is located "within a complex system of relationships among five nested environments" (D. I. Cross & Hong, 2012, p. 959)—microsystem, mesosystem, exosystem, macrosystem and chronosystem (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006; Mligo, 2015; D. Price & McCallum, 2015). In this model, each layer is affected and shaped by the other layers (Harms, 2005). Bronfenbrenner's ecological model is useful for explaining the sociocultural influences that shape teachers' 'assessment for learning' practices in secondary schools.

The microsystem refers to the innermost layer, which encompasses a set of activities, roles and interpersonal relationships experienced by a developing individual within their immediate settings (Miller, Brownell, & Smith, 1999; Mligo, 2015). The setting closest to the child could be "objects to which he [sic] responds or the people with whom he [sic] interacts [with] on a face-to-face basis" (Bronfenbrenner, 1979, p. 7). According to Pound (2011), it is through these interactions that knowledge of language and cultural tools are acquired in the immediate environment. Thus, an understanding of the school microsystem would help in examining teachers' 'assessment for learning' practices (D. Price & McCallum, 2015).

The mesosystem is the second layer consisting of a system of microsystems (Mligo, 2015). The mesosystem consists of transactions and connections among the

microsystems in which the child is actively involved (Bronfenbrenner, 1979; D. I. Cross & Hong, 2012; Harms, 2005; Miller et al., 1999). Transactions in a child's environment could involve the home, school and neighbourhood peers, while in an adult's environment transactions could include the family, work and social life (D. I. Cross & Hong, 2012; Mligo, 2015). Bronfenbrenner (1979) emphasises that one setting (for example, home) where the child spends time has connections with the other settings (for example, school), and these connections and transactions influence the child's development. D. I. Cross and Hong (2008) argue that understanding the influence of the mesosystem aids understanding teachers' and students' conceptions of assessment.

The exosystem, the third layer of Bronfenbrenner's model, consists of an extension of the mesosystem (Harms, 2005; Mligo, 2015). This layer comprises a larger social system (places and people) with which the child has no direct contact or active involvement. However, events occurring in the more extensive social system might have profound indirect influences on the child's immediate setting (Bronfenbrenner, 1979; D. I. Cross & Hong, 2012; Garbarino & Abramowitz, 1992). Examples of the larger social system includes parents' respective workplaces and network of friends. Similarly, events which could impact on teachers include parent-teacher associations, the school board and government agencies (D. I. Cross & Hong, 2012). Thus, Bronfenbrenner's exosystem offers explanations for the complex nature of teachers' beliefs and practices.

The fourth layer of Bronfenbrenner's model is the macrosystem, which concerns the societal and cultural context (Duchesne, McMaugh, Bochner, & Krause, 2013; Harms, 2005; Tissington, 2008). Changes in the macrosystem tend to significantly influence the other layers of the system, which in turn influence an individual's development (Bronfenbrenner, 1979; D. I. Cross & Hong, 2012). The societal context includes laws and structures (Duchesne et al., 2013), such as policy changes and curriculum reforms. The cultural context indicates the system of knowledge, beliefs, norms and customs shared by a group of people (Harms, 2005). For Garbarino and Abramowitz (1992), culture distinguishes "what is normal for one time and place" (p. 149). Dominant beliefs, values and recognised practices within a culture or subculture would profoundly influence an individual's practices (Harms,

2005; Tissington, 2008). According to D. Price and McCallum (2015), the macrosystem may “have filtering effects into the teachers’ microsystem” (p. 199), which help to explain teachers’ assessment practices.

The fifth layer of Bronfenbrenner’s model is the chronosystem. This layer represents the dimension of time, which influences all four previous layers (Bronfenbrenner & Morris, 2006; D. I. Cross & Hong, 2012; Duchesne et al., 2013). As a child develops, the various settings and systems have different outcomes, and influence them in diverse ways (Duchesne et al., 2013). The chronosystem includes life changes for teachers, which may be beneficial for examining the impact of various settings and systems that frame an individual’s assessment beliefs and practices (D. Price & McCallum, 2015).

Bronfenbrenner’s ecological model is helpful for understanding human growth and development within a social context. It is generally agreed that growth and development are influenced by human beliefs (further discussed in the next section), and Gao and Watkins (2002) underline that human beliefs appear to be context-dependent. Hence, Bronfenbrenner’s ecological model is useful for understanding teachers’ ‘assessment for learning’ practices within the Mauritius context. Since understanding teachers’ assessment beliefs was an aim of this study, the next section explores teachers’ beliefs and the complex and messy relationship between beliefs and practices.

### ***Teachers’ beliefs and practices***

A belief is a mental construct of reality that contains clusters of beliefs about physical and social reality (Muñoz, Palacio, & Escobar, 2012; Rokeach, 1968). Several authors view beliefs to vary along a central-peripheral dimension (Phipps & Borg, 2009; Remesal, 2011). There is a consensus among many social scientists that the more central a belief is, the more resilient it is to change (Chien, Wu, & Hsu, 2014; Pajares, 1992; Phipps & Borg, 2009; Remesal, 2011; Rokeach, 1968). Pajares (1992) explains “the more a given belief is functionally connected ... with other beliefs, the more central the belief” (p. 318). As such, beliefs that are more connected incorporate beliefs attributed to a person’s identity, those shared by



others, and beliefs gained from first-hand experiences (Haney & McArthur, 2002; Pajares, 1992; Rokeach, 1968). On the other hand, beliefs about matters of taste are considered to have fewer connections, and are thus regarded as peripheral (Pajares, 1992).

Teachers' beliefs can be described as the assumptions held by teachers regarding knowledge, teaching, learning, assessment and the nature of a discipline, such as Technology Education (G. T. L. Brown, Chaudhry, & Dhamija, 2015; Buehl & Beck, 2015; Chien et al., 2014; Remesal, 2011). Teachers' beliefs can influence teachers' practices, including assessment practices (Barnes, Fives, & Dacey, 2015; Borg, 2006; Farrell & Ives, 2015), to a greater extent than school contexts and teachers' experiences (Griffiths, Gore, & Ladwig, 2006; Remesal, 2011).

There are many published studies indicating a close connection between teachers' beliefs and practices (Farrell & Ives, 2015; Levin & Wadmany, 2006; Lumpe, Czerniak, Haney, & Beltyukova, 2012; Remesal, 2011; Song & Looi, 2012; Thoonen, Slegers, Peetsma, & Oort, 2011). Therefore, an analysis of teachers' belief structures seems vital for understanding their assessment practices (Pajares, 1992).

Beliefs are filters that strongly influence teachers' practices in curriculum decision-making (Fives & Buehl, 2012). For Hargreaves (1989), "what the teacher thinks ... believes, assumes—all these things have powerful implications for the change process, for [how] curriculum policy is translated into the curriculum practice" (p. 54). It appears that learners experience diverse motivational behaviour and educational opportunities based on teachers' beliefs (Ennis & Chen, 1995; Thoonen et al., 2011). Previous research has established that teachers possess a variety of beliefs about their practices, such as constructivism and instructivism approaches (Hancock & Gallard, 2004; Snider & Roehl, 2007).

Similarly, teachers' beliefs drive their assessment practice (Fives & Buehl, 2012). G. T. L. Brown, Kennedy, Fok, Chan, and Yu (2009) conducted their research in Hong Kong which involved nearly 300 teachers from 14 schools (primary and secondary). This study revealed that when teachers have beliefs that assessment is

used to hold students and school accountable through high-stakes examinations, then they emphasise test-like assessment (G. T. L. Brown et al., 2009). However, when teachers trust that assessment enhances students' learning, they increase the use of informal and diagnostic assessment (G. T. L. Brown, 2011). For example, G. T. L. Brown et al. (2015) found that Indian teachers from private secondary schools modified their teaching plans and provided students with formative feedback. A study conducted in New Zealand primary and secondary schools shows that teachers adopted assessment beliefs that allowed them to function within their own policy framework (G. T. L. Brown, 2011).

However, discrepancies in teachers' beliefs and their practices have been reported (Basturkmen, Loewen, & Ellis, 2004; R. Cross, 2010; Fang, 1996). Kilgore, Ross, and Zbikowski (1990) found that contextual factors, such as administrator and collegial attitudes, can support or weaken the effectiveness of beginner teachers by affecting their beliefs. Other contextual constraints include policy reform, backwash effects of high-stakes testing and classroom life (Fang, 1996).

An alternative argument identified from several studies is that beliefs are shaped when teachers engage in specific practices and actions (Buehl & Beck, 2015; Lumpe et al., 2012; Rushton, Lotter, & Singer, 2011). For instance, after an introductory course that included a 20-hour practicum in which pre-service teachers were observed when they interacted with students with disabilities, Swain, Nordness, and Leader-Janssen (2012) found an increase in teachers' beliefs about inclusive practices.

It should be noted that even if beliefs are considered to influence actions, they are not permanently in harmony with those actions (Hancock & Gallard, 2004). For example, teachers may have firm personal beliefs, but with policy reforms in assessment practices, they might transform their practices. V. Richardson (1996) explains, "experiences and [reflection-on-action] may lead to changes in [and] additions to beliefs" (p. 104).

Another alternative position between teachers' beliefs and practices is that there exists a mutual but complex interaction between the pair. Several researchers

consider that beliefs and practices shape one another, and the strength of interaction between them may differ across settings and individuals (Basturkmen, 2012; Turner, Warzon, & Christensen, 2011). Buehl and Beck (2015) propose that the strength of interaction would also depend on the varieties of practices and beliefs under study.

There is also evidence suggesting that teachers' beliefs may not be associated with classroom practices (Jorgensen, Grootenboer, Niesche, & Lerman, 2010; Liu, 2011). For example, S.-H. Liu (2011), who surveyed 1,340 teachers, found that 79% of them held learner-centred beliefs; however, the teacher-participants reported using lecturing instead of constructivist approaches. One possible explanation could be that the contextual factors in that setting cause misalignment between the beliefs and practices.

According to Boody (2008) and Farrell and Ives (2015), modifications to teachers' beliefs and practices could be triggered by reflection. Teachers reflecting on their beliefs and practices means thinking "over prior experience, [making] sense of it, [learning] from it, and presumably [becoming] a better teacher in the future" (Boody, 2008, p. 500). Reflection consists of self-awareness often realised through introspection performed before and after one's practice (Hoffman-Kipp, Artiles, & López-Torres, 2003). However, the amount of energy and dedication required for reflecting on one's beliefs and practices could be intimidating (Stanley, 1998).

Nevertheless, reflections on one's beliefs and practices do not always seem to be enough to enhance practice. Communities of practice might provide such opportunities for teachers to critically examine their underlying beliefs and practices (those guiding their 'assessment for learning' behaviours).

### ***Communities of practice***

In using the term 'community', Lave and Wenger (1991) suggest that they "do not imply some primordial culture-sharing entity" (p. 98). What the authors mean is that members of a community have diverse interests, contribute to activity and hold various notions. In a community of practice, groups of people jointly work on regularly valued activities for learning to take place (Fetterman, 2002; Lave &

Wenger, 1991; Wenger, 1999). This social process ends up forming social relationships among the individuals involved (Farnsworth, Kleanthous, & Wenger-Trayner, 2016).

Wenger (1998) defines a community of practice along three key dimensions: joint enterprise, mutual engagement and shared repertoire. Joint enterprise is about negotiating the goals, procedures and processes unifying the members on a mutual and continuous basis. Mutual engagement involves engaging members to interact and build a relationship binding them into a social entity. The shared repertoire is the obvious outcome of the community of practice, which is about the sharing of collective resources (stories, reflections, concepts, plans, activities and tools) that partners acquire over time.

Reflecting on these dimensions, a teacher's community of practice could be described as a "group of [teachers] sharing common concerns, set of problems, or a passion about a topic and who deepens their knowledge and expertise in this area by interacting on an ongoing basis" (Culver & Trudel, 2006, p. 98). Hence an understanding of communities of practice could be helpful to understand if teachers, as members of the community, jointly construct explanations of what they do, how they do it and why they do it.

Whether communities of practice arise naturally or not, the institution always influences their development. Most communities of practice exist irrespective of an institution's recognition; a few could require initiation and support, while others could flourish on their own (Wenger, 1998). Wenger claims that many communities are best left alone as they might fade away under an institution's attention. Wenger adds that the majority flourish under some attention, as long as this attention does not restrict their self-organising drive.

Irrespective of the creation and existence of communities of practice, teachers' development relies on internal leadership (Wenger, 1998). Internal leadership could take many forms, such as boundary, institutional and day-to-day leadership. These leadership positions could be formal or informal, but to be effective, managers and others (teachers and inspectors) have to "work with the communities of practice

from the inside rather than merely attempt to design them or manipulate them from outside” (Wenger, 1998, p. 7).

Leadership within communities of practice is seen as distributed. Therefore, when teachers are involved in communities of practice, they have a shared understanding of their field, which guides them to extend and improve their practices based on that understanding. Robert and Pruitt (2009) claim that teachers are accepted as “experts and sometimes are more effective than outside consultants” (p. 57). However, teachers cannot be experts in all domains of their practices, which are also context dependent. Thus, in some situations, recognised experts’ contributions can be brought in through professional learning and development to enhance teachers’ practices (Harlen, 2010; Wenger, 1998).

## **Summary**

This chapter has provided a critique of the literature relevant to the research questions underpinning this research study. The relevant literature on assessment and the relevant theories of how learning is shaped through approaches of teaching and assessment have been explored. Also, the influence of teachers’ beliefs, environmental influences and institutional constraints have been examined.

The next chapter presents an outline of the cultural and educational background of the Republic of Mauritius, which was necessary for understanding D&T teachers’ ‘assessment for learning’ practices on the island. The chapter analyses curriculum documents and several research studies conducted in the context related to this study. The chapter concludes by outlining the relevant research questions.

## CHAPTER THREE

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### THE CONTEXT

The previous chapter, the literature review, evaluated and critiqued the recent and relevant research, which assisted understanding teachers' 'assessment for learning' practices in Design and Technology (D&T). These included the purposes of educational assessment, current issues in educational assessment, 'assessment for learning' and Technology Education. The chapter also focused on the sociocultural theory that informed this study and three theories (Bourdieu's notion of habitus, Foucault's concept of power-knowledge and Bronfenbrenner's ecological systems theory) that provided the theoretical framework to explain the influence of context on teachers' 'assessment for learning' practices.

Since this research was designed to understand D&T teachers' 'assessment for learning' practices in the Republic of Mauritius, it is essential to have an overview of the study context. Hence, this chapter describes the Republic of Mauritius' culture, its education system and curriculum, and teachers' assessment practices. The D&T curriculum and assessment practices are also reviewed and critiqued. The chapter critiques a selected number of research studies, which explored assessment practices that have led to this investigation in 'assessment for learning' in D&T. The chapter ends by outlining the research questions for this study.

Several databases were used to search for relevant literature associated with education in the Republic of Mauritius, such as the Government of Mauritius and Google websites. Policy documents and other literature were obtained from the Government of Mauritius' web portal and websites of ministries, departments, and parastatal organisations, namely the Ministry of Education and Human Resources, Tertiary Education and Scientific Research (MOEHRTSR), Ministry of Finance and Economic Development (MOFED), Government Information Service, Mauritius Institute of Education and Mauritius Examination Syndicate. Google Search was used to locate previous research conducted in the education sector. A number of particular terms were utilised, for example, curriculum, assessment,

Design and Technology, formative assessment, history and thesis, which were paired with the term Mauritius.

### **3.1 Context of Assessment in the Republic of Mauritius**

‘Assessment for learning’ cannot be understood in isolation, so the context in which the study was conducted is explained. This section begins by briefly describing the background of the Republic of Mauritius, including the location, ethnic groups, religions and language used, as these influence education.

#### **3.1.1 Mauritius culture**

The Republic of Mauritius is a group of islands in the Indian Ocean, with a surface area of 2,040 km<sup>2</sup> (Salverda, 2015; The World Bank, 2015). Previously a French colony (1715–1810), the Republic of Mauritius was under British rule from 1810, before gaining independence in 1968, and later becoming a Republic in 1992 (Auleear Owodally, 2007; M. Griffiths, 1998; Selvon, 2005; Singh, 1984). The 2016 population statistics indicate that of the 1,263,862 multi-ethnic people in the Republic of Mauritius, 1,221,150 lived on the main island of Mauritius, 42,396 resided on Rodrigues and 274 stayed on the other islands (MOFED, 2011, 2017b; Salverda, 2015).

The Republic of Mauritius has never had a native population. Due to its historical factors, the Republic’s populace consists of descendants of emigrants (Sukon, 2011a). The 2011 Census identifies four ethnic groups: Indo-Mauritians, Creoles, Sino-Mauritians and Franco-Mauritians (MOFED, 2011). The Indo-Mauritians are citizens of Indian origin and comprise 68% of the population. Creoles and African descendants represent 27% of the inhabitants. Franco-Mauritians are citizens of French origin and Sino-Mauritians are of Chinese descent who represent 2% and 3% of the population, respectively (Eriksen, 1998; MOFED, 2013; Rajkomar & Gupta, 2008; Salverda, 2015).

The citizens of the Republic of Mauritius are a blend of different religions and races, and can be categorised into four main religions: Hinduism, Catholicism, Buddhism and Islam (Burrin, 2011; Dindyal & Besoondyal, 2007). The people following

Hinduism and Islam are from India; those following Buddhism are from China; and those following Catholicism are from India, China, Africa and France (Eriksen, 1998).

Several languages are used in the Republic of Mauritius. Both the British and French have colonised the islands, and as a result, the official languages of the islands have remained English and French (Auleear Owodally, 2007). English is the language of instruction at all levels in schools (Dindyal & Besoondyal, 2007; Eriksen, 1998; Sukon, 2011a) except for a few French-medium schools. Creole language (now known as Mauritian Kreol) is spoken and used in daily interactions by 84.0% of the population (MOFED, 2011, 2013; Rajah-Carrim, 2008). The Bhojpuri language is used by 5.3%, French by 3.6%, and other languages by 7.1% of the inhabitants (MOFED, 2011, 2013; Rajkomar & Gupta, 2008). Amongst other languages, oriental and Asian languages, such as Hindi, Urdu, Tamil, Telugu, Marathi, Arabic and Mandarin, are still in use (Dindyal & Besoondyal, 2007; Eriksen, 1998; Rajah-Carrim, 2008). As for English, it is not commonly used socially (Auleear Owodally, 2007; Rajkomar & Gupta, 2008).

This section provided a brief background of the Republic of Mauritius. The next section examines how education was provided to learners at the beginning of the 21<sup>st</sup> century. Then, the 2009 curriculum is briefly compared with the new 2015 curriculum. The focus of this study is on the 2009 *National curriculum framework: Secondary* (NCFS); however, a few changes introduced via the 2015 *Nine-Year Continuous Basic Education* plan are also analysed. Also discussed are several areas related to curriculum within the Republic of Mauritius setting, such as assessment, curriculum leadership, teacher education, professional learning and development, and D&T.

### **3.1.2 Major reforms of the education system**

The Ministry of Education (MOE) oversees and manages education in the Republic of Mauritius. The MOE decides the education policies in accordance with the Government (Sukon & Jawahir, 2005). Major educational reforms have taken place



with each new Government regime, which B. Levin (1998) describes as an epidemic of change and reform in education.

The education system of the Republic of Mauritius has largely been shaped by the British and French education systems (Auleear Owodally, 2007; Burrin, 2011; Rajah-Carrim, 2008; Sukon, 2011a). It comprises four main levels as shown in Table 3.1: two years of pre-primary, six years of primary, seven years of secondary (3+2+2) and formal tertiary education (Burrin, 2011; M. Griffiths, 1998; MOEHR, 2012).

Table 3.1 *Mauritius Education System (Mainstream)*

Levels	Category	Age	Number of years
	Early child-care	0–3	
1	Pre-Primary	3–5	2
2	Primary	6–11	6
3	Secondary		
	Lower secondary	12–14	3
	Upper secondary	15–16	2
		17–18	2
4	Tertiary	18+	

*Note.* Adapted from MOEHR (2012).

The MOE implemented several reforms to promote education in the Republic of Mauritius. This section highlights major reforms in the last three decades that influenced assessment understanding, procedures and perception in the Republic.

Before 1990, pre-primary education, which was similar to the first year of primary school, was mainly offered by private individuals (MOEHR, 2000). For socioeconomic reasons, not all children of that age group could attend school, but after the *Jomtiem conference* held in 1990, the Government aimed to have all pre-primary school children in appropriate buildings with trained teachers (MOEHR, 2000). The main goal of the 1991 Master Plan for education, based on the *Jomtiem conference*, was “Education for All” (Parsuramen, 2006, p. 64).

Before 2001, students completing their primary education were ranked based on their Certificate of Primary Education (CPE) examination scores. The highest ranked students were rewarded with a seat in prestigious secondary schools known as ‘star’ schools, while average students were assigned to low-rated schools having significantly fewer resources (Burrin, 2011; Chumun, 2002). To gain access to the ‘star’ schools, nearly 70% of students sitting for the CPE examinations resorted to private tuition (Burrin, 2011; Chumun, 2002; M. Griffiths, 1998; Sukon, 2011a) with the intent to improve their examination scores.

In 2001, a grading examination system was introduced for the CPE examination and the ranking system abolished (Ministry of Education and Scientific Research [MOESR], 2001, 2004; MOEHR, 2009). The MOE recognised the CPE ranking system had consequences for children’s futures; those passing could proceed to secondary education, while those failing were deprived of further education. With the grading system, the students not achieving the minimum grade for the CPE examination (after two attempts) were instead directed towards a Pre-Vocational Education stream which lasted for three years (MOESR, 2004), without having to retake the CPE examination (MOESR, 2001).

The MOE introduced a regional policy of admission to secondary schools using the grading system (Burrin, 2011). Mauritius was divided into four zones (see Appendix A), with Rodrigues representing the fifth zone (MOEHR/TESR, 2013; MOESR, 2004). The regionalisation system overcame students’ long-distance travelling. Students starting secondary schooling were not provided entry to the ‘star’ state secondary schools as these were converted into single-gender *Form 6 colleges* (for students undertaking their sixth and seventh years of secondary education) (Burrin, 2011; MOESR, 2001; Sukon, 2011b). Students gained entry to the *Form 6 colleges* based on the grade aggregate of the School Certificate (SC) examinations (end of the fifth year secondary school examination). As a result, the fierce competition remained due to the limited number of prestigious secondary schools and *Form 6 colleges* (Burrin, 2011).

After 2001, the Government constructed several state secondary schools. The MOE needed these institutions for two main reasons (MOEHR, 2000; MOESR, 2001): first, the increasing number of students attending secondary school; and second, a lack of schools in several regions that led to students travelling long distances to attend school. It was encouraging that the Government built the new schools in the developing residential and mostly sub-rural areas. The infrastructure was there; however, anecdotal evidence suggests that most of these schools lacked teaching and learning resources compared to the other state secondary schools.

Despite the new state secondary schools lacked resources, students preferred going there than attending private-aided secondary schools, mainly because of the quality of education and proximity to students' dwellings. The term 'private-aided' signifies that the Government provided staff salaries and yearly grants to the private providers. As a result, several private-aided secondary schools had to close their doors (MOEHR, 2000).

However, despite the education changes before 2005, not much was achieved. Sukon (2011b) argues that the backwash effects of the primary school national and secondary school international examinations (high-stakes) led to teaching that promoted rote learning and preparation for tests. The pressure to perform well for these selection examinations put considerable pressure on students.

In 2005, the incoming Government made further educational amendments. The MOE abolished the *Form 6 colleges* system and again allowed students to sit for the CPE examination to access the 'star' secondary schools. Regionalisation was maintained but with the introduction of a new A+ grade for the CPE examination (Burrin, 2011; Government Information Service, 2007). With an aggregate system, students with the best aggregate gained admission to 'star' secondary schools irrespective of geographical locations, while the remaining students gained entry to the 'prestigious' and 'lower standard' secondary schools based on geographical locations.

In 2008, the MOE proposed a modified education system whereby the Pre-Vocational Education stream was eliminated (MOEHR, 2009). However, in 2012

the Pre-Vocational Education stream was extended to four years (MOEHR, 2014). There was a contradiction with the amendment of the Education Act of 2005, which specified that education in the Republic of Mauritius was compulsory up to age 16 (Ministry of Education, Culture and Human Resources [MOECHR], 2008) because several students were completing the Pre-Vocational Education by age 15.

After 2005, significant construction works were undertaken in several secondary schools. There were extensions and completions of classrooms, the building of new gymnasiums and the provision of amenities in numerous state secondary schools (Government Information Service, 2012). The number of ‘star’ schools was increased. Even private providers upgraded their schools (MOECHR, 2008). These changes made aimed to provide an enhanced educational environment and educational access for all children.

Another reason for the major improvements was the increasing number of students within the schools. The number of students participating in SC examinations increased from 15,501 in 2005 to 17,489 in 2010, while for HSC examinations, the figures escalated from 7,274 in 2005 to 10,429 in 2014 (Mauritius Examination Syndicate, 2015).

Table 3.2 presents a breakdown of the primary and secondary school administration in 2014 (MOFED, 2014). There were 320 primary schools in total, of which 305 were in Mauritius and 15 in Rodrigues. There were 176 secondary schools in total, of which 170 were in Mauritius and the remaining six in Rodrigues.

Table 3.2 *Number of Primary and Secondary Schools in Mauritius and Rodrigues in 2014*

Island	School	State	Private-aided	Private-non-aided	Total
Mauritius	Primary	213	48	44	305
	Secondary	68	82	20	170
Rodrigues	Primary	10	5	1	15
	Secondary	-	6	-	6

*Note.* Adapted from MOEHR (2014).

The current study was conducted based on the MOE's 2011 education reform (see Appendix B), and its main highlight was the introduction of a national examination at the secondary level for 14-year-olds (MOEHR, 2014). The MOE termed this examination the National Certificate of Achievement. Anecdotal evidence suggests that this supplementary examination put further pressure on students to do well in this examination. Further information on this examination is provided in section 3.1.2.

When the present study was being designed in 2015, the succeeding Government brought fundamental changes to the education system with the introduction of 'Nine-Year Schooling' through the *Nine-Year Continuous Basic Education* (MOEHRTESR, 2015c) document. The structure of the new education system consisted of four levels (see Appendix C): early childhood care (3 to 5-year-olds), basic education (Grades 1–6; 6 to 11-year-olds), post-basic education/upper secondary (Grades 7–13; 12 to 18-year-olds) and post-secondary and higher education (MOEHRTESR, 2016). With 'Nine-Year Schooling', the MOE made provision so that all children would complete nine years basic education through six years of primary and three years of lower secondary schooling. The MOE eliminated the Pre-Vocational Education stream, which stigmatised students as failures at an early age (MOEHR 2011; MOEHRTESR, 2016). However, it is unclear what the children with learning disabilities would learn and achieve with three or four additional years in the mainstream system.

With the introduction of 'Nine-Year Schooling', the terms 'grade' and 'key stage' were used to identify the primary and secondary levels. The six years of primary were termed 'Grade 1–6' and the seven years of secondary levels were termed 'Grade 7–13'. Every two years of primary and secondary was grouped as a key stage (see Table 3.3), except Grade 7–9, which consisted of three years, was grouped as a key stage. Table 3.3 also shows the changes in the primary and secondary from *Towards a quality curriculum: A strategy for reform* (TQC) (Standard and Form) to *Nine-Year Continuous Basic Education* (grade and key stage). There have also been changes in assessments, which are further elaborated in section 3.1.2.

Table 3.3 *Primary and Secondary Education Structure of the Towards a Quality Curriculum: A strategy for reform and Nine-Year Continuous Basic Education*

Level	Age	Towards a Quality Curriculum		Nine-Year Continuous Basic Education	
		Standard	Form	Grade	Key stage
Primary					
	6	1		1	One
	7	2		2	
	8	3		3	Two
	9	4		4	
	10	5		5	Three
	11	6		6	
Secondary					
	12		1	7	Four
Lower	13		2	8	
	14		3	9	
	15		4	10	Five
	16		5	11	
Upper	17		6	12	Six
	18			13	

*Note.* Adapted from MOEHR (2006) and MOEHRTER (2016).

The MOE proposed two types of admission for students into primary and secondary schools. The MOE decided to admit students to Grade 1 (primary) and Grade 7 (lower secondary) by regions (zones). Entry to Grade 10 (upper secondary) was granted both at regional and national levels (MOEHRTER, 2016).

‘Nine-Year Schooling’ allowed three choices for Grade 9 students: remain at the regional secondary schools where they enrolled, pursue their studies in general education in academies (nationally), or follow vocational programmes in specialised vocational schools (nationally) (MOEHRTER, 2016). The MOE

suggested that 12 academies (ex-‘star’ state secondary schools) would operate in a co-educational set-up from the year 2021 (MOEHRTEsr, 2016). However, only a selected number of students would be able to attend the academies. Arguably, as a result, instead of reducing competition, this change has increased it.

Through ‘Nine-Year Schooling’, the MOE made a special provision for students identified with learning difficulties after primary education. Since the MOE decided to promote all primary school students to Grade 7 after completing Grade 6, students with learning disabilities would be allowed four years, instead of three years, to complete the basic education (MOEHRTEsr, 2016). An encouraging aspect of ‘Nine-Year Schooling’ is that with the elimination of the Pre-Vocational Education stream, all students would be allowed to follow the same programme. However, it remains unclear why attention would be given to children with learning disabilities after attempting the first national examination, after six years, and not earlier.

### ***The curriculum***

Before elaborating on the Republic of Mauritius curriculum, it is imperative to clarify the distinction between the terms ‘curriculum’ and ‘syllabus’. Several authors claim that some confusion inevitably surrounds these terms (Print, 1993; Westbury, 2008; R. V. White, 1988; Woods, Luke, & Weir, 2010). R. V. White (1988) states that the confusion exists because the United States and Great Britain used the terms differently. In Great Britain, “‘syllabus’ refers to the content or subject matter of an individual subject, whereas ‘curriculum’ relates to the totality of content to be taught and aims to be realised” (R. V. White, 1988, p. 4). Nevertheless, the two terms tend to be used interchangeably in the United States (R. V. White, 1988).

For numerous authors (Luke, Woods, & Weir, 2013; Print, 1993; R. V. White, 1988; Woods et al., 2010), the syllabus is considered to be a subsection of the curriculum. Woods et al. (2010) define curriculum as follows:

Curriculum is the sum total of resources—intellectual, scientific, cognitive, and linguistic—that is brought to bear on the dialogue and exchange of teaching and learning. It includes documents, textbooks and adjunct resources and materials, both official and unofficial—that are brought together by teachers and students to structure teaching and learning in classrooms and other learning environments. (p. 362)

In this study, the British interpretation of the terms was adopted for two reasons. First, the Republic of Mauritius followed the British system of education. Second, the Republic of Mauritius education system relies on the *Cambridge International Examinations*.

A curriculum can be referred to at various levels, such as a national curriculum, school curriculum, classroom curriculum or subject curriculum (McGee, 1997; McLachlan, Fler, & Edwards, 2013; Scott, 2008). The national curriculum is a document providing a framework to the state schools in a country or state. In the Republic of Mauritius, the national curriculum offers a framework for the state and private-aided schools.

The national curriculum is linked closely with the culture of the society. Since the society continuously evolves, inevitably, from time to time, the national curriculum requires changes to cope with the variations in the society (A. Moore, 2014; Print, 1993). In Mauritius, over the last three decades, different governments have made curriculum reforms. Before implementing such drastic changes, proper infrastructure is required as well as several studies and analyses needed (R. Jacob & Frid, 1997). However, there has been, and continues to be, an absence of research studies in curriculum design and development in the Republic of Mauritius (Auleear Owodally, 2007). The area of the curriculum has, and remains, a challenging feature of the Republic of Mauritius' educational setting.

Under British rule, the Republic of Mauritius followed the British curriculum. Since the 1970s, numerous attempts were made by the Republic of Mauritius to own its curriculum (Auleear Owodally, 2007). The idea was to adapt school curricula to the needs and realities of the context.



In 1975, the Mauritius Institute of Education was founded and given the responsibility for curriculum development (MOE, 1973; Sukon, 2011a). However, in 1985, this responsibility was handed to the Curriculum Development Centre, a department of the MOE, which became the National Centre for Curriculum Research and Development in 1993 (Sukon, 2011b). From 2006, the responsibility for curriculum development was restored to the Mauritius Institute of Education, following which a National Curriculum Steering Committee was setup (MOEHR, 2006).

In the last decade, two significant reforms took place in curriculum design and implementation: first, from 2006 to 2009 (TQC), and second, from 2015 to 2016. In 2006, the first National Curriculum Framework (NCF) was presented through the document *Towards a quality curriculum: A strategy for reform* (MOEHR, 2006). In 2008, the *National curriculum framework: Primary* (MOEHR, 2008) was launched, a year after the *National curriculum framework: Secondary* (NCFS) (MOEHR, 2009) was presented, and finally in 2010, the *National curriculum framework: Pre-primary* (MOEHR, 2010) was introduced. With a change in Government, in 2015, a new NCF was presented as *Nine-Year Continuous Basic Education* (MOEHR/TESR, 2015c). In the same year, the *National curriculum framework: Grades 1 to 6* (MOEHR/TESR, 2015a) and the *National curriculum framework: Grades 7, 8 and 9* (MOEHR/TESR, 2015b) were presented. However, before the two major reforms, teachers relied entirely on the curriculum content for each subject.

A fundamental dimension of the curriculum is the ideology underpinning its design (McLachlan et al., 2013). Schiro (2013) identifies four dominant ideologies that shaped curriculum in the United States. Each ideology represents distinct beliefs about “the type of knowledge that should be taught in schools, the inherent nature of children, what school learning consists of, how teachers should instruct children, and how children should be assessed” (Schiro, 2013, p. 2). McLachlan et al. (2013) argue that these ideologies have contributed to curriculum design in various countries, including Australia and New Zealand.

The four ideologies (Schiro, 2013) are as follows: the scholar academic, the social efficiency, the learner-centred and social reconstruction. The scholar academic ideology is premised on the idea that our society has accumulated valuable knowledge over time, which has been structured into academic disciplines (Williams, 1996). In this ideology, the teachers are considered to have a thorough understanding of their disciplines. The teachers, mini-scholars, are expected to transmit to their students the contents of the disciplines and ways of thinking in the disciplines (McLachlan et al., 2013; Schiro, 2013).

The social efficiency ideology is based on the notion that the needs of society are met proficiently by educating learners to be contributing members of their community (Schiro, 2013). In this ideology, teachers should identify the most efficient way to educate students, thus fulfilling the needs of society (McLachlan et al., 2013; Schiro, 2013). The advocates of this ideology consider that teachers develop the curriculum objectives in behavioural terms.

The learner-centred ideology is based on the ideas that the needs of the learner dominate (Schiro, 2013). Learning is viewed to occur when an individual interacts with his/her environment, with emphasis laid on integrity, personal growth, uniqueness and autonomy (Williams, 1996). Thus, teachers are expected to create the appropriate atmospheres, contexts and activities for their students' learning growth (McLachlan et al., 2013; Schiro, 2013).

The exponents of the social reconstruction ideology assume that the purpose of education is to construct a fair society by offering maximum satisfaction to the learners (Schiro, 2013). Social reconstructionists view education as a medium to prepare the child to restructure the society for the better (McLachlan et al., 2013; Schiro, 2013; Williams, 1996).

The TQC framework seems to be a mixture of the above four ideologies, but with a focus on learner-centred ideology. It outlined a shift from subject-centred to learner-centred educational approaches (MOEHR, 2006; UNESCO, 2010). The vision of the MOE seemed guided by the principles of justice, equity and social inclusion. The TQC framework aimed to help schools to meet the individual

learning needs of all students and provide them with a strong base for lifelong learning (MOEHR, 2008, MOEHR, 2009, MOEHR, 2014). The MOE sought that the children become autonomous individuals.

With the emerging social and economic requirements in the Republic of Mauritius, the MOE believed that with the TQC framework, the learners would be equipped with the necessary skills and knowledge to live harmoniously in a multicultural society (MOEHR, 2014). New subjects, such as Bhojpuri Language, Travel and Tourism, and Entrepreneurship Education, were introduced at the secondary level (MOEHR, 2014). Also, Physical Education was acknowledged to be examinable at SC and HSC level (MOEHR, 2014). To enable learners to cope with the changing world, the MOE introduced a new optional subject at SC level called Science for All (MOEHR, 2014). This subject was presented for non-science students to acquire scientific knowledge and skills. The MOE also sought to refine the curriculum, and make a place for some co- and extra-curricular activities depending on students' specific needs and contexts (MOEHR, 2009). The reforms proposed for assessing students is further discussed in section 3.1.2.

Although the MOE made several curricula changes in the TQC framework from 2006 to 2014, the core philosophy of the curriculum persisted. Anecdotal evidence suggests that teaching practice was more transmission than facilitation. The focus of teaching remained on developing students for uniformity rather than diversity. Teachers tended to implement the syllabus to the letter (Dindyal & Besoondyal, 2007). In the Republic of Mauritius context, learning was viewed as an atomistic process. The teachers were primarily concerned with the cognitive dimension of the child (MOEHR/TER, 2016).

Fullan and Pomfret (1977) and Günes (2015) claim that during such a mismatch between intended curricula changes and its implementation, several strategic questions impacting on change should be asked:

- were the changes proposed apparent to the teachers and principals who were responsible for applying the curriculum?
- were the teachers qualified and educated to implement the changes?

- were schools equipped in terms of structures and resources to implement the changes?

The *Nine-Year Continuous Basic Education* curriculum also focused on the learner-centred ideology. The documents stress UNESCO's four sustainable developmental goals: holistic development, inclusive and equitable, lifelong learning, and quality learning time (MOEHRTEsr, 2015c). The 'Nine-Year Schooling' ideology was similar to the TQC ideology. However, through the 'Nine-Year Continuous Basic Education', additional non-core subjects were introduced that emphasised well-being. The new subjects were performing arts, and life skills and values.

'Nine-Year Schooling' also emphasised five key competencies that learners needed to develop and attain through a holistic education: civic skills, learning skills, personal and social skills, critical, creative and innovative thinking skills, and information and communication skills (MOEHRTEsr, 2015b). For all students to complete nine years of basic schooling, the MOE proposed the implementation of the differentiated curriculum. Yet it remains to be seen if the learner-centred ideology will be realised.

### **Assessment**

When the Mauritius Institute of Education was established, it also had the responsibility for administering assessment and examinations activities. However, this responsibility was transferred to the Mauritius Examination Syndicate, which was founded in 1984 (Sukon, 2011b). Since then, the Mauritius Examination Syndicate has been responsible for all national and international examinations conducted in primary and secondary schools.

In 1980, the Certificate of Primary Education (CPE) Examination was introduced by combining the Primary School Leaving Certificate and the Junior Scholarship Examination (Chumun, 2002; M. Griffiths, 1998; Meade, 2011). Students sat for these two examinations at the end of the sixth or seventh year of primary education (UNESCO, 2001). These two examinations were conducted within a period of one month, which exerted excessive pressure on the students (M. Griffiths, 1998;

Kellaghan & Greaney, 1992). The students attempted the Junior Scholarship Examination to gain scholarships and admission to one of the small number of Government secondary schools (M. Griffiths, 1998; UNESCO, 2001). Places in these schools were limited. When these two examinations were merged, the CPE examination then served two purposes: assessment and selection (Chumun, 2002). Gradually, this selection exercise became predominant, leading to intense competition and distorting the aims of primary education because good grades for the CPE examination provided access to the Government secondary schools. The ranking system of the CPE examination was a major problem along with a high failure rate (about 30% before re-sit) which led to about 25% of students dropping out at the age of 12 (Chumun, 2002; M. Griffiths, 1998; MOFED, 2015; UNESCO, 2001). There was no provision for students struggling with their learning (M. Griffiths, 1998).

Secondary school students in the Republic of Mauritius sit for two *Cambridge International Examinations: School Certificate* (SC) at the end of the fifth year and *Higher School Certificate* (HSC) at the end of the seventh year. The continuation of these examinations reveals the colonial historical heritage of the British (Hunma, 2002; Sukon, 2011b).

These three examinations (CPE, SC and HSC) have had backwash effects for a long time in both the primary and secondary schools in that teaching and learning were mostly used to prepare for these three high-stakes examinations (M. Griffiths, 1998; Hunma, 2002; Sukon, 2011b). Education in the Republic of Mauritius promoted rote learning (Chumun, 2002; Naugah & Watts, 2013). Although the Republic of Mauritius was considered to have a well-established education system, “the differences in achievement scores for children attending the same level of education suggest that our system [was probably] not addressing learning difficulties” (Sukon, 2011a, p. 25).

In the early eighties and mid-nineties, the MOE attempted to introduce continuous assessment (Chumun, 2002; Sukon, 2011b). With the implementation of a new form of assessment, teachers were aware of the need for professional development to familiarise themselves with these new purposes of assessment. Consequently, the

teachers resisted due to lack of support and the amount of time required for the upgrading (Chumun, 2002; Sukon, 2011b). Several teachers (at the primary level) claimed that continuous assessment could be successful in other countries but would not succeed in the local context (M. Griffiths, 1998).

Through the TQC reforms, the MOE proposed a new form of assessment (MOEHR, 2006). The TQC framework outlined assessment practices based on the learner-centred ideology. The MOE introduced baseline profiling, diagnostic assessment, formative and continuous assessment at the primary level (MOEHR, 2008) and continuous assessment at the secondary school level (MOEHR, 2009) to facilitate students' growth. For example, the NCFS suggests that "there should be more weight given to formative and continuous assessment" (MOEHR, 2009, p. 169). However, the *National curriculum framework: Primary* (MOEHR, 2008) also suggests that summative assessment is used from Standard three (8-year-olds). Despite the proposed reforms in assessment, teachers continued focusing on end-of-term assessments (Chumun, 2002). The assessment approaches adopted by teachers show that assessment (MOEHRTESR, 2016) was still being conducted based on the scholar academic ideology (Schiro, 2013).

At the secondary level, teachers in most subjects assessed their students through teacher-designed formal end-of-term tests and end-of-year examinations. Anecdotal evidence suggests that the end-of-term test was usually the preferred method of formal assessment, and most schools recommended a specific number of tests per term from Form 1 to 6 (12- to 18-year-olds). End-of-year examinations were carried out by each school from Form 1 to 4 (12- to 15-year-olds), and at Lower 6 (17-year-olds). Form 6 is split into two and termed Lower 6 and Upper 6. A few schools also combined 20% to 30% of term marks for the end-of-year grade. At Form 5 (16-year-olds), and Upper 6 (18-year-olds) levels, mock examinations were done at the end of the second term, before the students sat for the final international examinations (UNESCO, 2010).

The NCFS, launched in 2009, emphasised the use of formative assessment, continuous assessment and 'assessment for learning' across all levels, even if the importance of summative assessment was also stated (MOEHR, 2009). The NCFS

encouraged teachers to use ongoing formative assessment. However, the NCFS emphasised that “the end-of-term tests and end-of-year examinations will also be part of the assessment scheme” (MOEHR, 2009, p. 59).

In 2010, the MOE piloted a national assessment project at the end of lower secondary schooling (14-year-olds) (Burrin, 2011). The examined subjects were as follows: English, French, Mathematics, Science (Physics, Chemistry and Biology) and ICT (MOEHR, 2013). In 2013, the MOE officially implemented the national assessment (MOEHR, 2013). According to the MOE, this national assessment was implemented for two reasons. First, to evaluate the level of competencies attained, and second, to identify the students’ strengths and weaknesses that would aid in taking corrective actions (MOEHR, 2006). However, the introduction of an additional national examination was in contradiction with the MOE’s aims to implement continuous assessment and expect teachers to emphasise formative assessment.

With the introduction of ‘Nine-Year Schooling’, the MOE again brought assessment reforms, both at the primary and secondary levels. The MOE recognised that classroom assessment influences students’ learning (MOEHRTER, 2016). The MOE acknowledged that the high-stakes examinations of the previous education system put students under unnecessary stress. Thus, the new assessment policy would allow the use of a wide range of alternative modes of assessment (MOEHRTER, 2016). The MOE elaborates that “to reduce over-emphasis on examinations, a system of continuous assessment for formative purposes and school-based assessment to complement end-of-year assessment will be introduced” (MOEHRTER, 2016, p. 11).

At the primary level, the MOE suggested three main types of assessment: continuous classroom assessment, school-based summative assessment and national assessment. According to the *NCF: Grades 1 to 6*, continuous assessment would take the form of ‘assessment for learning’ and ‘assessment as learning’ at all levels. The *NCF: Grades 1 to 6* suggests the use of continuous assessment rather than relying exclusively on tests and examinations (MOEHRTER, 2015a). However, there would be a school-based summative assessment (assessment of

learning) that would be used to report the performance of the students. This national assessment replaced the CPE and was termed the Primary School Achievement Certificate (MOEHRTEsr, 2015a).

This national examination included a modular assessment (MOEHRTEsr, 2015a). Two subjects, Science, and History and Geography, would be assessed at two different times (MOEHRTEsr, 2016). First, at the end of Grade 5 and then at the end of the second term of Grade 6. One-off assessments would be conducted at the end of Grade 6 in English, French, Mathematics and optional languages. For the MOE, this modular examination approach would reduce examination pressure arising from the one-off form of assessment (MOEHRTEsr, 2016). However, it is evident that one-off examinations in three core subjects would still be undertaken.

At the secondary level, the national examination at the end of Grade 9 was termed the National Certificate of Education. The MOE also implemented fundamental changes for the National Certificate of Education examination. All subjects offered, including D&T, would be examined nationally.

With ‘Nine-Year Schooling’, it seemed that greater emphasis was laid on the learner-centred ideology. However, it is unknown whether teachers would change their assessment practices. Anecdotal evidence suggests that the strong academic and examination traditions still dominate the education system.

For Günes (2015), when significant changes are made in the curricula, it is essential that all stakeholders embrace the reforms. If principals and teachers do not embrace the changes, this leads to waste of effort, time and money. Three necessary conditions are required to ensure teachers embrace curricula reforms: curriculum leadership, teacher professional learning and development, and teacher education. These three conditions are discussed in the next sections.

### ***Curriculum leadership***

Leadership has a significant role in education. Two main types of leadership in education discussed by several authors include transactional and transformational



leadership (Emery & Barker, 2007; McCormack et al., 2002; Sergiovanni, 1990; Vito, Higgins, & Denney, 2014). Transactional leadership is based on bureaucratic authority where the leaders stress employee compliance and task completion that they control (Emery & Barker, 2007). Transformational leadership presents employees with the capacity to innovate and perform beyond their expectations, thus transforming both themselves (their practice) and their institution (Emery & Barker, 2007; Hallinger, 2003). For Jerreries (2000), transformational leaders are those who are perceived to promote teacher development, shared culture, mutual engagement, critical thinking and creative problem-solving. The advocates of leadership (Fidler, 1997; Hallinger, 2003; Hannay & Earl, 2014; Henderson & Hawthorne, 2000; Leithwood, 1992) consider that it is transformational leadership (curriculum leadership) that would help teachers improve their practice (including ‘assessment for learning’).

For Hoppey and McLeskey (2013), principals can direct teachers’ professional growth through distributed leadership, which implies that teachers are provided opportunities to assume leadership roles in schools. Several authors claim that distributed leadership best supports school transformation and change; it encourages teachers to move outside of their comfort zones and stimulates their professional learning (Hulpia, Devos, Rosseel, & Vlerick, 2012; M. Jones & Harris, 2014; R. E. White, Cooper, & Anwaruddin, 2016).

However, research conducted by Ah-Teck and Starr (2012), in the Republic of Mauritius, involving six principals from both primary and secondary schools, suggests that distributed leadership in schools is still at an infancy stage. This study found that the principals imposed their visions (through transactional leadership) rather than using a collaborative approach by involving teachers in decision-making. Ah-Teck and Starr (2012) claim that the principals gave responsibilities to those they trusted and who would support their way of “seeing and doing things” (p. 6).

### ***Teacher education, and professional learning and development***

Chumun (2002) emphasised that an area of continual concern in the education sector in the Republic of Mauritius is the need to educate teachers in the field of

continuous assessment and remedial education. Two ways through which teachers could be educated in these areas include teacher education, and teacher professional learning and development.

The Mauritius Institute of Education has been the leading provider of teacher education in the Republic of Mauritius. The Mauritius Institute of Education offers teacher education from pre-primary to secondary and at different levels: Certificates, Advanced Certificates, Diplomas, Bachelors, Postgraduate Certificates, Masters and Doctoral studies. The Bachelors, Masters and Doctoral programmes are offered in association with other local and international institutions. The Mauritius Institute of Education also provides managerial cadre Postgraduate Diploma programmes in Educational Leadership and Educational Management.

In 2006, when the TQC framework for the Republic of Mauritius was launched, the MOE emphasised that teacher education and continuous professional learning and development would be provided (MOEHR, 2006). The MOE recognised that all teachers would have to undertake teacher education before joining the teaching profession. The MOE stated that teachers would be given “opportunities for [education] and upgrading of their qualifications” (MOEHR, 2006, p. 16). Even when teacher education was provided, a few questions remained: how well has the teacher education served its purpose? Have the assessment practices of teachers changed?

Up until a decade ago, secondary school teachers in the Republic of Mauritius were still recruited without a teaching qualification. Most teachers enrolled for a teaching qualification after joining the teaching profession. The 2017 education statistics report reveals that many mainstream secondary school teachers (5,036 teachers or 60.28%) do not have a professional qualification (teaching qualification). Table 3.4 indicates the highest academic qualification of secondary schools mainstream teachers (MOFED, 2017a). Further information concerning the teachers’ academic qualifications, displayed in Table 3.4, was obtained from personal correspondence. Table 3.4 also indicates that 279 (62+2+215) teachers (or nearly 3.34%) possess only an SC or HSC qualification.

Table 3.4 *Number of Secondary Mainstream Teachers Categorised by the Highest Academic Qualification and Absence of Professional Qualification in 2016*

Highest academic qualification	Number of teacher	Number of secondary mainstream teacher with no professional qualification
School Certificate or equivalent	145	62
Not passed Higher School Certificate or < 2 A level	6	2
Higher School Certificate or equivalent Certificate	608	215
Diploma	168	97
First Degree	479	261
Postgraduate	5799	3616
Master of Philosophy or Doctorate	1,137	772
	12	11
<b>Total</b>	<b>8,354</b>	<b>5036</b>

*Note.* Adapted from MOEPD (2017a) and personal correspondence.

Table 3.5 indicates the highest professional qualification that secondary school teachers have (MOEPD, 2017a). Supplementary information concerning the teachers' professional qualifications was gained through personal correspondence from the statistics office. Only 3,318 teachers (39.72%) possess a teaching qualification, out of which 507 (6.07 %) do not have a Bachelor in Education (MOEPD 2017a).

Table 3.5 *Highest Professional Qualification of Secondary School Mainstream Teachers in 2016*

Highest professional qualification	Number of teacher	%
No professional qualification	5036	60.28
Teacher's Certificate/Advance Certificate	46	0.55
Teacher's Diploma	461	5.52
Bachelor of Education/Physical Education	509	6.09
Postgraduate Certificate in Education	2147	25.70
Postgraduate Diploma in Educational Leadership/Management	36	0.43
Master of Education	119	1.43
<b>Total</b>	<b>8,354</b>	<b>100</b>

*Note.* Adapted from MOEPD (2017a) and personal correspondence.

For curriculum and assessment reforms to take place, changes are also required at the level of teachers' professional learning and development. Hargreaves (1989)

explains that “changes in the curriculum [and assessment] is not effected without some concomitant change in the teacher” (p. 54) because it is the teacher who ultimately implements the curriculum, pedagogy and assessment at classroom level. What the teacher thinks, believes or assumes has substantial implications for the way in which curriculum and assessment are implemented in the classroom (Hargreaves, 1989). See section 2.2.3 for further discussion of the role of teachers’ beliefs in assessment.

Also, the MOE specified that the Mauritius Institute of Education would provide professional learning and development in several areas. It was expected that all teachers would have to follow “an intensive continuous training programme, through a series of workshops, seminars, school-based training sessions to support the reform process” (MOEHR, 2006, p. 17). Two areas of learning and development regarding assessment were “new modes of evaluation and assessment such as record keeping and observation techniques” and “remedial education and pastoral care” (MOEHR, 2006, p. 17). However, the MOE has done little to date to realise their curriculum’s promise of continuous professional learning and development. For example, Burrin (2011, p. 95), who conducted a survey involving 90 teachers from 18 state secondary schools in Mauritius claims that

61.1% of the respondents declare that they have not been on training ... since at least 2008. Some even argue that they have not had any training since their induction course, and others deplore the fact that they did not have any training at all.

Several principals from Ah-Teck and Starr’s (2012) research claimed that they provided professional learning opportunities to their teachers, which covered wide-ranging areas such as assessment and teaching of mixed-ability classes. However, Ah-Teck and Starr (2012) contend that this so-called staff development “seemed to be ad hoc orientation sessions to disseminate school protocols and policies and, therefore, cannot be called professional learning” (p. 9).

In 2016, after another significant educational reform, the MOE again acknowledged the need for teachers’ professional learning and development (MOEHRTESR,

2016). The MOE claims to have taken the required measures to strengthen teachers' professional learning and development through "collaborative practices ... within and across schools, [the] community of practice, [and] mentoring" (MOEHRTESR, 2016, p. 12). The MOE adds that a culture of learning among teachers would be established (MOEHRTESR, 2016).

The MOE provides little professional learning for teachers. The Mauritius Examination Syndicate has conducted most of the professional learning workshops available. These workshops are mostly organised to educate teachers about the Cambridge International Examinations syllabi and examination papers. For example, regarding the Primary School Achievement Certificate examination, it was reported that the MOE planned "to organise workshops for teachers ... regarding the new test paper models" ("Nine-year education," 2017, para. 7). Despite the need to introduce new teaching and assessment approaches, professional learning is sparse in the Republic of Mauritius. The emphasis of the MOE has remained on high-stakes examinations.

The previous sections evaluated and critiqued the curriculum policies of the Republic of Mauritius while emphasising assessment, curriculum leadership, teacher education, and professional learning and development. The following section analyses the D&T curriculum, including its assessment practices.

### ***Design and Technology Curriculum***

This section discusses the subject of D&T in depth, to provide a clear understanding of the context in which teachers' 'assessment for learning' practices were investigated. The focus is primarily on the state secondary schools in Mauritius since this study was conducted in these schools (see section 4.5.5). The section begins by elaborating how D&T is a gendered subject in Mauritius followed by a discussion on the lack of attention given to D&T. Finally, the subject structure and components at the lower (12- to 14-year-olds) and upper (15- to 18-year-olds) secondary levels are explained.

D&T in Mauritius “has so far been largely restricted to boys’ schools, with very few exceptions” (MOEHR, 2009, p. 107). Seven out of the 68 state schools in Mauritius are mixed-gender schools, and only these schools offered D&T to girls (statistics obtained from personal correspondence). A few private-aided schools provide D&T to girls irrespective of whether these schools are mixed or not, and only four private non-aided schools offer D&T to girls.

There is a paradox surrounding the proposal of offering D&T to lower secondary school girls in Mauritius. On the one hand, the MOE proposed “the introduction of Technology as a compulsory learning domain for both boys and girls” (MOEHR, 2009, p. 22), thus removing preconceived gender notions. The Technology domain includes D&T, Information and Communications Technology, and Home Economics, and it was stated in the NCFS that “all these components will be compulsory for all students” (MOEHR, 2009, p. 22). On the other hand, the MOE claims that girls would have to choose between D&T and Design, Clothing and Textile. The MOE adds that

... in a bid to provide gender equity, girls should not be debarred from taking Design & Technology with Communication as the pathway. It is, therefore, proposed that the option for girls [at] Forms [1–3] be either D&T or Design, [Clothing] & Textile. (MOEHR, 2009, p. 107)

The NCFS also mentioned that Design and Communication (D&C) at upper secondary was offered in several boys’ schools not having a workshop (specialist room and resources) for D&T. Instead of providing equal opportunities to all students undertaking D&T, at all levels and irrespective of gender, the MOE claims that D&C could be “carried out within a classroom with minimum equipment that any girls’ school should be able to afford” (MOEHR, 2009, p. 107). However, this proposal of offering D&T (the D&C component) to all girls of lower secondary remained on paper.

Out of the 68 state secondary schools, 61 schools are under the direction of the MOE, and seven are under the aegis of the Mahatma Gandhi Institute and the Rabindranath Tagore Institute Council. Thirty-one out of the 61 are boys’ schools,

while one is a co-education school. D&T is compulsory for Form 1–3 (12- to 14-year-olds) in the boys' schools while in the co-education school, both genders can opt for either D&T or Home Economics. Out of the seven Mahatma Gandhi Institute and the Rabindranath Tagore Institute Council state secondary schools, six are co-education mainstream schools, and D&T is compulsory at Form 1 and 2 levels, while optional (students can select between D&T and Home Economics) at Form 3 level. In the other co-education mainstream school, no specialist room for D&T is available, and hence, students in that school focus on the D&C component.

In Mauritius, D&T from Forms 1–3 consist of two main components: product design and practical technology, and graphic products. In product design and practical technology students design and make products using various materials and techniques. Product design and practical technology include topics, such as, properties of materials, structures, electronics and controls, tools, mechanisms, ergonomics and energy. In graphic products students design and make products using various graphics and modelling materials. The component of graphic products (also referred as D&C) includes topics, such as, modelling, freehand sketching, charts, development, presentation, drawing systems and geometry.

The subject is split into two and termed D&T and D&C at Form 4 and 5 (15- to 16-year-olds). When starting Form 4, students are streamed into their choice of subjects (economics, science, arts and technical streams) and those opting for the technical stream have to choose either D&C or D&T in state schools. Most private-aided and private-non-aided schools offer only D&C because the management of these schools are not willing to invest in the facilities required for D&T, such as, space for specialist rooms (metal and wood), workbenches, machines (circular saw) and tools (mitre box).

At Lower and Upper 6 (17- to 18-year-olds), D&T reverts to one subject area. The state, private-aided and private-non-aided secondary schools (boys and co-education schools), which offer the subject, continue to do so at Lower and Upper 6, with a few exceptions. The Lower and Upper 6 classes follow the HSC syllabus (Cambridge International Examinations), which has two parts. The first part includes core content and is compulsory for all D&T students opting for the subject.

The second part has three optional focus areas, and it is up to the schools and students to select one option from product design, practical technology or graphic products. Schools having D&T facilities (specialist rooms and equipment) allow their students to choose between available options (depending on availability of students). However, schools not possessing D&T facilities deprive students of the other two alternatives, thus forcing them to undertake graphic products for the second part of the syllabus.

With the introduction of ‘Nine-Year Schooling’, the status of D&T seems affected. For Grades 7–9, D&T would be merged with Food and Textile Studies, and a new subject introduced and termed Technology Studies (MOEHRTESR, 2015b). All students would have to undertake Technology Studies irrespective of gender. However, it seems that the teaching time and content of D&T would be reduced to make room for the changes.

Assessment is an essential element that contributes to students’ learning in D&T. Since this study explored D&T teachers’ ‘assessment for learning’ practices, the next section elaborates on assessment in D&T within the Mauritius context, across all levels.

#### *Assessment in D&T*

This section begins by elaborating how assessment, such as, tests and examinations (local and international), in D&T take place from Form 1 to Upper 6. This section also discusses how teachers conduct informal assessment and what the NCFS proposes about formative assessment and ‘assessment for learning’ in D&T.

The NCFS recognises that D&T requires a holistic and user-friendly approach to assessment (MOEHR, 2009). The policy document also highlights that formative modes of evaluation should be encouraged as these promote students’ learning (MOEHR, 2009). For example, a wide range of approaches to assessment should be used, such as self-assessment, logbooks, portfolios, practical works and observations.



Like most subjects in Mauritius schools, D&T teachers assess the subject through end-of-term tests and end-of-year examinations. End-of-term tests are formal assessments, and the principals recommend a specific number of tests every month or term across all levels (Belle, 2007). However, a few D&T teachers make use of practical work, classwork and presentations to generate the end-of-term grades (for example, one test and continuous assessment). Several senior D&T teachers also use 30% continuous work that is added to end-of-year examinations to provide end-of-year grades, but only for Forms 1–4 and Lower 6. At Form 5 and Upper 6, like other subjects, mock examinations are carried out at the end of the second term before the students sit for the Cambridge International Examinations. Even with the introduction of the National Examination at Form 3 (14-year-olds; equivalent to Grade 9 in other countries) level, D&T is not examined nationally. Thus, most teachers keep assessing D&T as per their past practice.

This section synthesised the background and contextual information related to the education system, curriculum, assessment and D&T context of the Republic of Mauritius. The following section critiques some research studies conducted in the education sector of the Republic of Mauritius that have led to this current research related to teachers' 'assessment for learning' practices in D&T.

### **3.1.3 Research studies conducted in the Republic of Mauritius**

An online search of research studies carried out in the Republic of Mauritius revealed that a small number were in educational assessment. An overview of a selected number is presented which were undertaken mainly in secondary or primary schools, and/or explored assessment practices. These studies are reviewed as they indicate how teaching, learning and assessment are carried out in the Republic of Mauritius context.

Two studies were conducted at the secondary level. Naugah and Watts (2013) explored the approaches to teaching in science classrooms in four schools. Eighty classroom observations (60 science lessons and 20 non-science lessons) at Form 3 (14-year-olds), and 16 teachers interviews in two state and two fee-paying schools were conducted. This research indicated that influential factors alienating girls from

learning science were due to the transmission teaching approaches. The authors also found that there was little opportunity for collaborative and activity-based learning, while rote learning was the primary technique students used to learn (Naugah & Watts, 2013).

Burrun (2011) conducted her research study in 2011 for the award of a Masters degree. This study aimed to investigate whether quality education could be realised in an education system, which was content-driven. Burrun (2011) administered a survey to 90 teachers from 18 state secondary schools in one of the four educational zones of Mauritius. Burrun's study revealed that the education approaches in the state secondary schools were "content-driven and [did] not pay much attention to the all-round development of students" (p. 115). The rhetoric of the educational plan seemed to be mass education rather than quality education (Burrun, 2011).

Two studies were also identified at the primary level and were carried out 15 to 20 years ago. Chumun (2002) conducted a case study in four state schools to explore teachers' knowledge and practices about classroom assessment processes. This doctoral study involved 35 teachers who taught from Standard 4–6 classes (9- to 11-year-olds). This case study research involved two high performing schools and two low-performing schools. One pair of schools (high performing and one low performing) was from the urban regions, while the other pair was from rural areas.

The findings of Chumun's (2002) study revealed that the teachers in the four state primary schools used traditional pedagogy. The emphasis was on whole class teaching and lower level learning intentions (Chumun, 2002). The study indicated that the teachers treated all students in the same way and gave them the same activities even if they had different abilities. For Chumun (2002), no provision was made for the less able students. This research study also highlighted that the two most common methods used during classroom assessment were questioning and observation. However, Chumun (2002) claims that questioning was used to seek specific answers from students.

M. Griffiths (1998) carried out a qualitative inquiry in two primary schools. This study aimed to generate an understanding of primary education (M. Griffiths, 1998,

2000). Data were gathered through classroom observations, and students' stories and drawings. Also, in-depth interviews with a range of stakeholders (school-based and outside school) of the primary education were conducted. The school-based participants were parents, teachers (mainstream, oriental/Asian languages and trainee), administrative secretaries, pupils, head teachers and assistant head teachers. Outside school, participants were people from various educational organisations and departments, such as, the Mauritius Institute of Education, Mauritius Examination Syndicate, MOE and Non-Government Organisations.

M. Griffiths' (1998) study revealed that the CPE examination forced the primary school students to compete for the restricted number of good secondary schools. Also, teacher-centred "instructional methods, the valuing of encyclopedic knowledge, hard work and uniformity and the practices of 'ability privileging' and 'differential treatment' of pupils ..." (M. Griffiths, 1998, p. 4) were highlighted.

Only one study relevant to this research, conducted at the tertiary level by Mohabuth and Ahmad (2014) was identified. This mixed method research at the University of Mauritius investigated the influence of formative assessment on students' learning and development during practice learning. First, a questionnaire was administered to undergraduate students from four faculties undertaking work-based practice. A modified questionnaire was then administered to their mentors. The researchers also organised two focus group interviews with several students and mentors. This study revealed that students felt that "increased interactive sessions were required between mentors and students" and "formative assessment was better planned in practice learning, as compared to classroom learning" (p. 102). The study also indicated that formative assessment allowed the mentors to monitor students' progress, clarify students' doubts and enable students to reflect on their learning.

From these research studies in the Republic of Mauritius context, it can be argued that the professional practice of teachers, specifically the area of formative assessment or 'assessment for learning' has been insufficiently researched and theorised. As a result, the Government of the Republic of Mauritius and the MOE have little research to guide their practices of improving the educational system. The Mauritius Institute of Education, which is in charge of conducting research and

curriculum development in the Republic of Mauritius, appears to have done little research in the area of teachers' assessment practices (including their 'assessment for learning' practices).

Since the NCFS implementation in 2009, no one has examined teachers' 'assessment for learning' practices (including D&T teachers' 'assessment for learning' practices) in Mauritius. Despite having officers of the MOE frequently visiting schools to observe teachers' practices, little is known about teachers' 'assessment for learning' practices (the same applies for 'assessment as learning' and 'assessment of learning').

Because no research study could be identified that investigated teachers' assessment practices in Mauritius secondary schools, as well as limited research on teachers' assessment practices in Technology Education (Hartell et al., 2015; Williams, 2016), there was a need for an in-depth exploration that informs stakeholders in Mauritius and the research community of such practices. To partly address this need, the focus of this study was on the 'assessment for learning' practices of D&T teachers in state secondary schools. The next section explains the research problem and presents the research questions for the current study.

### **3.2 Research Questions**

In the last decade, much prominence has been given to formative assessment, continuous assessment and 'assessment for learning' in the teaching and learning process in the Republic of Mauritius. The MOE stressed that assessment methods providing "useful feedback for formative purposes should be used" (MOEHR, 2006, p. 20). Also, the MOE declared that the "Ministry shall gradually integrate continuous assessment in the system" (MOEHR, 2009, p. 65).

The policy documents recognise the importance of assessment to inform students' learning. The MOE recommended "the development of assessment tools for learning which will aid teachers to monitor students' learning ..." (MOEHR, 2009, p. 93). The policy documents emphasise that formative, placement, diagnostic, and continuous assessment should be used. For example, the NCFS mentioned that

since the curriculum highlights the process rather than the product of learning, the focus of assessment should be on assessing the multidimensional aspects of learning as it is taking place in the classroom. Formative and continuous assessment must be given more emphasis. (MOEHR, 2009, p. 226)

The MOE suggests that formative assessment is valued as it is considered to motivate students and enhance their learning. The MOE stressed “both formal and informal assessment ... be used by teachers to assess the progress of students and provide feedback for improvement” (MOEHR, 2009, p. 128).

When referring to assessment in D&T, the NCFS highlights the necessity of having “a careful, holistic and user-friendly approach to assessment ... in this area of learning” (MOEHR, 2009, p. 110). The MOE suggests that assessment methods should include “students’ self-evaluation, keeping of log[s] and journals, portfolios, interviews, observations, together with student interaction with the learning environment” (MOEHR, 2009, p. 110).

However, little classroom-based research has been conducted to determine the effectiveness of ‘assessment for learning’ in the Republic of Mauritius’ secondary schools. Not much is known about how the teachers conduct their ‘assessment for learning’ practices. A review of the few research studies undertaken in Republic of Mauritius’ primary, secondary and tertiary institutions (discussed in section 3.1.3) show that more research is needed to understand how teachers use assessment to promote learning in D&T.

Accordingly, the main research question was: How are the ‘assessment for learning’ practices of Mauritius D&T teachers framed? The sub-questions arising from the main question included the following:

- What are the teachers’ ‘assessment for learning’ practices?
- What guidelines are the teachers using for their ‘assessment for learning’ practices?

- What rationales do teachers use for implementing ‘assessment for learning’?
- What are the students’ conceptions of ‘assessment for learning’?

## **Summary**

This chapter provided relevant cultural and educational background of the Republic of Mauritius, which was necessary for understanding D&T teachers’ ‘assessment for learning’ practices in Mauritius. The chapter also analysed and evaluated the curriculum policies, while emphasising assessment, curriculum leadership, teacher education, and professional learning and development. The D&T curriculum, along with its assessment practices were discussed. The chapter ended by outlining the research questions for this study. The next chapter presents the research methodology of this study.



# CHAPTER FOUR

## METHODOLOGY

This chapter explains the methodological approaches utilised in understanding Design and Technology (D&T) teachers' 'assessment for learning' practices in Mauritius and answering the research questions. The first section briefly outlines the philosophical perspectives and focuses on the constructionist epistemology and interpretivist paradigm that guided this study. The second section explains the relevance of an ethnographic methodology for gaining insights into teachers' 'assessment for learning' practices. The third section elaborates on the relevance of mixed methods research. The fourth section describes the methods used to investigate teachers' 'assessment for learning' practices and the approaches adopted for analysing the data. Then the relevant ethical considerations are stated, and finally, the last section explains how quality was maintained throughout the study. An overview of the research design is illustrated in Figure 4.1.

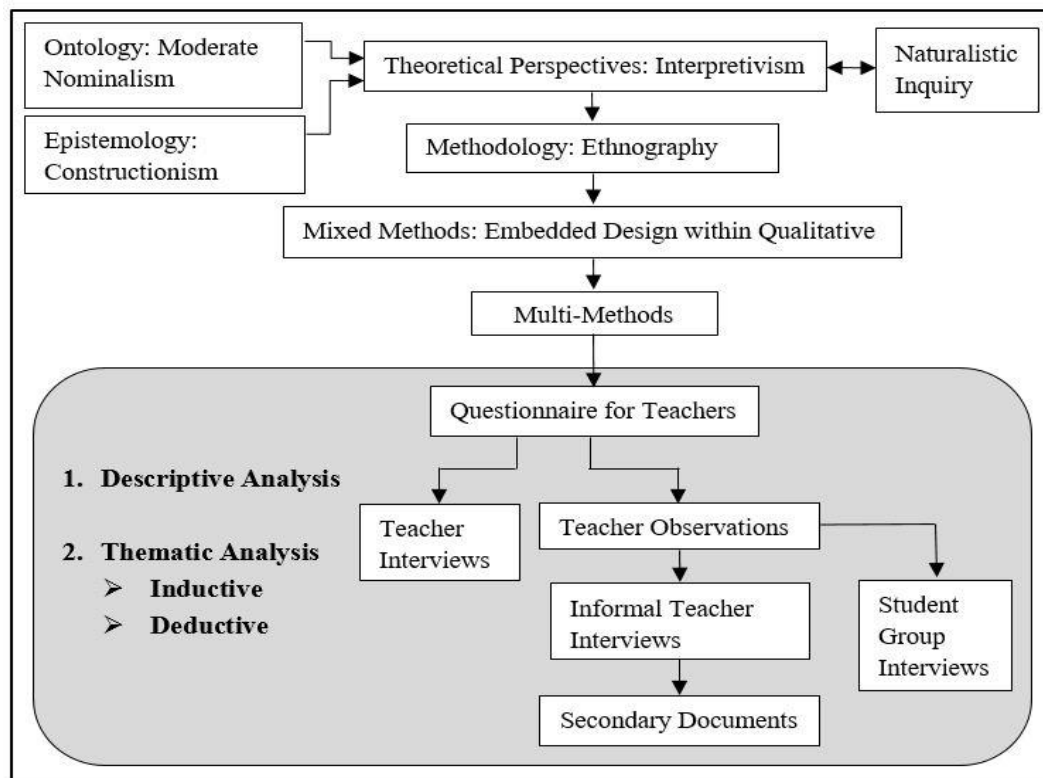


Figure 4.1 The research design



## **4.1 The Research Process**

When conducting a research study, its expectations, intent and motivation are established through paradigm selection (Glesne, 2016; Mackenzie & Knipe, 2006). A research paradigm is a “loose collection of logically related assumptions, concepts, or positions that orient thinking and research” (Bogdan & Biklen, 2007, p. 24).

As a starting point for understanding D&T teachers’ ‘assessment for learning’ practices, it was important to first clarify the epistemology, theoretical perspective, methodology, and methods employed in this study. In any investigation, these four elements are interrelated as one informs another (Creswell & Plano Clark, 2011; Crotty, 1998; Glesne, 2016). The chosen methods were guided by the selection of methodology, which in turn was informed by the theoretical perspectives of the research, which was influenced by the epistemological position of the researcher.

## **4.2 Philosophical Perspectives**

Two key philosophical approaches that help determine the research paradigms are epistemology and ontology (Schnegg, 2015; Wahyuni, 2012). Ontology is the study of what exists (the nature of existence) and what constitutes reality (Gray, 2014). Epistemology is the philosophy of knowledge (Krauss, 2005) or study of what we can know about reality (Crotty, 1998; Kalof, Dan, & Dietz, 2008). The principles and assumptions of these philosophical concepts form part of every research study, even if an investigator disregards them (Neuman, 2011). However, being conscious of the principles and assumptions of epistemology and ontology helps researchers improve their understanding of the choices required at different stages of their research (Glesne, 2016). The next section elaborates on ontological and epistemological assumptions and indicates the stance adopted in this study.

### **4.2.1 Ontology**

There can be varied conceptions of reality; Crotty (1998) presents two fundamental positions of ontology as realism and nominalism. The realists assume the existence of the world, irrespective of human actions, which are structured into pre-existing

categories awaiting to be revealed (Neuman, 2011). Nominalists see human experience with the world as an ongoing combination of inner subjectivity and interpretations, and claim that no one can exclusively detach the interpretative lens, but agree that “some interpretative schemes are more opaque than others” (Neuman, 2011, p. 92). In other words, there can be extreme or moderate nominalists’ views.

This study used a nominalist position in which social and physical human experience depends on interpretative and cultural factors (Neuman, 2011). Their contextual realities can socially explain the nature of individuals. Based on these realities, and subject to their lived experiences, every teacher’s view is considered to be possibly different (Creswell, 2013). The meaning each teacher makes is unique, leading to the construction of multiple realities. Even with the same contextual realities, the views of two individuals are accepted to be different. In this study, even if two teachers had similar qualifications, the same number of years of teaching/assessing experiences and taught in the same school, as a researcher within the interpretative and naturalistic paradigm, each teacher’s lived experiences were viewed and valued differently. In short, the study was designed to explore each participant’s constructed reality.

#### **4.2.2 Epistemology**

The epistemological perspective is relevant for two main reasons (Gray, 2014). First, an understanding of the philosophical concepts assists researchers to recognise suitable research designs for intended objectives. Second, several issues of the research design can be clarified, such as the organisation of the investigation and how evidence will be collected and interpreted.

Crotty (1998) identifies three main epistemological positions: objectivism, subjectivism and constructionism. Objectivist epistemology holds the position that meaning exists irrespective of human consciousness and knowledge is out there to be discovered. In this view, only the object contributes in generating meaning. On the other hand, subjectivist epistemology holds the view that the object does not assist in making meaning, but the subject establishes the meaning.

Constructionism rejects both objectivist and subjectivist views and considers that meaning cannot be explained entirely as objective or subjective (Crotty, 1998). Constructionism holds the position that meaning is generated through interactions between the subject and object (Crotty, 1998). Constructionists consider that there is no meaning without the mind because it is the subject who constructs meaning; meaning is not discovered. My epistemological position is that subjects create meaning by interacting with the world around them. I believe that regarding the same phenomenon, meaning is constructed in diverse ways. With constructionist epistemology, multiple "... contradictory but equally valid accounts of the world can exist" (Gray, 2014, p. 20). This study relates to teachers and students who construct meaning in various ways and have varying cultural contexts, so the constructionist epistemology was deemed most relevant.

In constructionism, individuals are seen as engaging with their world and constructing meaning out of it (Creswell & Plano Clark, 2011; Crotty, 1998). However, "such description is misleading if it is not set in a genuinely historical and social perspective" (Crotty, 1998, p. 54). When humans share the understanding of their world, inevitably the meanings are constructed through "social interaction with others and their own personal histories" (Creswell & Plano Clark, 2011, p. 40). Meanings are inevitably shaped by individuals' own cultures (Crotty, 1998), leading to knowledge that is bound to a particular place and time (Gergen, 1995; Vygotsky, 1978), and these interpretations continuously evolve (Crotty, 1998). Hence, diverse collective understandings of reality is conceivable (Schnegg, 2015). Constructionism has also evolved to incorporate social constructionism.

Social constructionists see reality as socially constructed by people (Lodico, Spaulding, & Voegtler, 2010). Different people create distinct conceptual frameworks based on their culture. It is our culture that "brings things into view for us and endows them with meaning and ... [in the same way], leads us to ignore other things" (Crotty, 1998, p. 54). Based on what is accepted and ignored, researchers attempt to understand how others make meaning of their world (Punch & Oancea, 2014) and accept that there is no true reality. Therefore, from this perspective, I sought to understand the multiple realities from the teachers' standpoints.

The epistemological position in this study is “constructionism” (Crotty, 1998, p. 42), where the world is perceived to be socially constructed and in which teachers create meanings through interactions with their peers, students, superiors and lecturers. The next section elaborates on interpretivism which aligns with the theoretical perspectives and is associated with constructionism (Gray, 2014).

#### **4.2.3 Theoretical perspectives**

A theoretical perspective is a philosophical position that informs a range of methodologies (Crotty, 1998). Choosing the proper theoretical perspective is vital as it guides the selection of an appropriate research design and the approach to data gathering and analysis. Several theoretical perspectives have been identified, such as positivism, post-positivism, interpretivism, critical inquiry, feminism and postmodernism (Crotty, 1998; Glesne, 2016; Gray, 2014; Mackenzie & Knipe, 2006; Neuman, 2011). The epistemological and ontological perspectives guided me to the interpretivism theoretical perspective, which is elaborated on in the next section.

#### ***Interpretivism***

This study used an interpretive paradigm. Researchers following the interpretive paradigm attempt to understand the subjective world of human experience (Cohen, Manion, & Morrison, 2011). In this paradigm, the researcher’s viewpoints are considered vital. To preserve the integrity of the research study, the researcher attempts to understand the participants from within (Cohen et al., 2011). Crotty (1998) claims that people have to be understood in relation to their culture because, in this perspective, individuals are considered to be influenced by other individuals, places and things in their surroundings. Thus, interpretivism aligns well with the theoretical framework of social constructivism, discussed in section 2.2.2, that gives insights into people’s experiences. Since the interpretive paradigm is concerned with the participants and their interpretations of the world around them (Crotty, 1998), it was seen appropriate as this study stressed understanding participants’ ‘assessment for learning’ interpretations and actions in their sociocultural context, which conforms with the sociocultural theory.

Gray (2014) identified five approaches of interpretivism: symbolic interactionism, realism, hermeneutics, phenomenology and naturalistic inquiry. Of these approaches, a naturalistic perspective is best suited to this research design because this study is concerned with teachers in their natural settings.

Naturalistic inquiry is based on the notion that data is gathered in real-world contexts. Naturalistic researchers agree that phenomena are best understood within their natural settings (Gray, 2014; Lincoln & Guba, 1985), for example, where they live or work (Athens, 2010). Based on this understanding, the researcher attempts to reach participants in their societal and cultural context to observe, describe and interpret the participants' experiences and actions (Armstrong, 2010). Conducting an inquiry into the participants' societal and cultural context allows a researcher to gain a more comprehensive understanding of the phenomenon under study (Owen, 2008).

A naturalistic inquiry approach refers to an investigation that considers the "natural integrity of the problem under study" (Athens, 2010, p. 94). To maintain a sense of natural integrity, research must be conducted in its natural setting without any "attempt to affect, control, or manipulate what is unfolding naturally" (Patton, 2014, p. 48). In such a mode of naturalistic inquiry, happenings must not be forced, introduced or constructed (Athens, 2010; Lincoln & Guba, 1985). However, according to Athens (2010), it is impossible for the natural integrity of any research to be not violated, so the attempt is always to minimise the violation. Thus, researchers must choose data gathering methods that respect and do not violate the natural integrity of the problem under study, given the practical realities embodied in researching the issue.

The naturalistic inquiry approach is commonly used for exploratory research (Walker, 2012). When related theoretical frameworks are unavailable, or little is known about a particular area of inquiry, then exploratory research is valuable (Armstrong, 2010). However, the aim of exploring a particular context is not to generalise findings (Lincoln & Guba, 1985), but to come up with interpretation and

theories that offer insights into human experience (Armstrong, 2010). Naturalistic inquiry was appropriate for this study because it allowed me to understand how the teachers perceived their world and why they acted the way they did. Moreover, because little was known about D&T teachers' assessment practices in Mauritius, naturalistic inquiry permitted me to understand the teachers' culture.

Once the theoretical perspective of this research study was confirmed, the next step was to identify the research methodology. The next section explains the choice of ethnographic methodology and a mixed methods approach.

### **4.3 Ethnographic Methodology**

A researcher adopting an ethnographic methodology is typically interested in understanding and describing the cultural life of a social group and the participants' viewpoints (Fetterman, 2010; Grenfell et al., 2012). Grounded in the fields of sociology and anthropology (Adam, 2015), the purpose of ethnography is to understand life through another lens, by concentrating on the everyday behaviour of participants, gained through fieldwork (Bloor & Wood, 2006).

Fieldwork is a significant element in any ethnographic research which shapes the design of the study (Fetterman, 2010). For example, data gathering methods and techniques, fundamental anthropological concepts, and analysis are essential components of ethnographic research. Ethnographers are usually involved in "watching what happens, listening to what is said, and/or asking questions through informal and formal interviews, [and] collecting documents" (Hammersley & Atkinson, 2007, p. 3). When in the field, building a rapport with the participants and gatekeepers is crucial for the researcher as this influences what is revealed and permitted to be observed (Bloor & Wood, 2006).

The time spent in ethnographic fieldwork raises several issues. Traditionally, ethnographers were involved for a prolonged time at a site, typically from six to 24 months or more (Gray, 2014; Punch & Oancea, 2014). However, modern ethnographers, which relates to my study, "link brief visits that extend over a long period ..." (Wolcott, 2005, p. 69). Wolcott (1985) argues, "length of time spent

doing fieldwork does not, in-and-of-itself, result in better ethnography or in any way assure that the final product will be ethnographic” (p. 39). The quality of ethnographic inquiry rests in the researchers’ familiarity and understanding of the areas of study (Wolcott, 1985). Familiarisation of the context is not solely time-dependent as Adam (2015) points out, but what matters most is “being there ...[and]... being involved with [the] ... participants for understanding their practices and experiences during the allocated period of time” (p. 73). Fetterman (2010) concurs and adds that long-standing extended fieldwork is critical to investigations in foreign cultures and not necessary for studies in one’s own culture.

Ethnographers explore and record human behaviours through an emic (insider) and etic (outsider) perspective to describe cultures and communities (Gray, 2014). The emic approach involves describing and analysing phenomena from the viewpoint of the participants, within a field of social activity, whose beliefs and behaviours are investigated (Godina & McCoy, 2000; Hammond & Wellington, 2013; Sockett, 2013). In contrast, the etic approach involves describing and analysing social phenomena with reference to concepts and categories derived within a discipline, which are considered to be meaningful by a group of observers (Godina & McCoy, 2000; Hammond & Wellington, 2013). This study used both the emic and etic views, but the focus was on the emic or the insider perspective.

#### **4.3.1 The insider perspective**

In most ethnographic studies, the insider’s perspective helps better understand and appropriately describe the scenes and behaviours (Fetterman, 2010). Proper understanding and accurate descriptions depend on the familiarity of the researcher with the phenomenon under examination (Burns, Fenwick, Schmied, & Sheehan, 2012; Griffith, 1998; O’Reilly, 2009).

Insiders are those who conduct research in their communities (Innes, 2009) and are “characterised with specified social statuses” (Kim, 2012, p. 264). As a result of the status of association with a research context, the insider researcher becomes well-placed to access and examine the phenomenon under investigation (Kim, 2012). The term ‘community’ has varying applications, for example, workplace, society

and country (Adam, 2015; Innes, 2009; O'Reilly, 2009). In-group members are referred to as insiders based on their past and present experiences and familiarity with the research context (Jenkins, 2000). Familiarity can further be established due to researchers' biographies, such as nationality, race, class and gender (Sanghera & Thapar-Björkert, 2008). The characteristics of an insider researcher are perceived to result in the construction of different knowledge than what an outsider-researcher would produce (Griffith, 1998). Since I am undertaking research in my country where I have previous experience as a D&T teacher and knowledge of teachers' assessment practices, I consider myself an insider researcher.

Being an insider in ethnographic research has benefits, but also raises several issues. Some identified advantages include: ease of entry to the settings, ease of gaining thorough information, early rapport building with participants, blending into the context more easily, and having linguistic competence (Burns et al., 2012; Mercer, 2007; O'Reilly, 2009; Simmons, 2007). The ease with which the researcher gains access from the gatekeepers is mainly due to the insider's background (Burns et al., 2012) and professional and institutional privilege (Sanghera & Thapar-Björkert, 2008). Gardiner and Engler (2012) and Kim (2012) emphasise that access to detailed evidence is only disclosed to insiders. Often participants are hesitant to disclose specific details to outsiders. Data gathering is also less time-consuming, as building rapport between participants and the researcher is faster (Mercer, 2007). Being an insider also favours the researcher during negotiations and interactions with the gatekeepers and the participants (Burns et al., 2012). Due to the investigator's linguistic competence, participants are more easily understood (O'Reilly, 2009). The insider advantages that were experienced in this study have been elaborated on in section 4.3.1. However, the insider perspective has challenges that needed to be anticipated.

Some identified insider's challenges include being over-familiar and having over-rapport with participants (Hammersley & Atkinson, 2007; Mercer, 2007; O'Reilly, 2009) and positionality (Sanghera & Thapar-Björkert, 2008). Over-familiarity on behalf of the insider can result in thinner data gathering. J. Mercer (2007) explains that the researcher can take some happenings for granted, ignore shared previous experiences, overlook familiar situations and omit key elements. Hammersley and



Atkinson (2007) use the term ‘over-rapport’ to indicate that, in some cases, investigators are too involved with participants, resulting in the inability to distance themselves from the contributor’s views. Positionality is considered to frame the professional and social rapports in fieldwork (Takeda, 2012). Sanghera and Thapar-Björkert (2008) stress that a researcher’s position is influenced by “facets of the self ... and aspects of social identity” (p. 553), such as institutional or professional advantage, nationality, religion, or gender. In this study, my familiarity with the D&T teachers and the context presented the possibility of over-rapport. Positionality was another challenge, and strategies, such as the used of mixed methods design (see section 4.4.1) and reflective notes (see section 4.5.6), were adopted to ameliorate these challenges. The next section elaborates on the mixed methods design used in this study.

#### **4.4 The Research Continuum**

Three major research paradigms can be identified: quantitative, qualitative and mixed methods (Gray, 2014; Johnson & Christensen, 2012; Morrell & Carroll, 2010; Patton, 2014). Quantitative research methods mainly follow confirmatory scientific approaches and focus on theory and hypothesis testing, prediction and deductive reasoning (Creswell, 2014; Johnson & Christensen, 2012; Johnson & Onwuegbuzie, 2004). For example, quantitative researchers judge that it is essential to first state assumptions or hypotheses, then collect data and later verify if the empirical evidence supports the assumptions or hypotheses made. The data gathered are reduced to numerical indicators that are analysed statistically (Glesne, 2016).

On the other hand, qualitative methods follow exploratory scientific approaches and use inductive reasoning (Creswell, 2014; Fraenkel, Wallen, & Hyun, 2012; Johnson & Christensen, 2012; Johnson & Onwuegbuzie, 2004). Qualitative research methods are used when not much is known about a particular topic, or when researchers intend to explore or learn more about the issue in question. Qualitative research methods are used to understand people’s experiences or practice and articulate their opinions (Johnson & Christensen, 2012).

Traditionally, quantitative methods were linked with positivist investigations and qualitative methods with interpretive investigations (Patton, 2014). Since this research followed an exploratory approach and was guided by constructionism and interpretivism, an exclusive use of quantitative research methods was not appropriate for this study. Constructionist researchers most often adopt qualitative data collection methods and analysis, or mixed methods (Mackenzie & Knipe, 2006), using a social constructivist theoretical framework (Bay, Bagceci, & Cetin, 2012).

One essential purpose of using mixed methods is to recognise that both the qualitative and quantitative methods have weaknesses, so a combination of the two can neutralise the shortcomings of each method (Creswell, 2014). Using both qualitative and quantitative methods is considered to provide a better understanding of this research problem rather than using only the qualitative methods (Creswell, 2014; Mackenzie & Knipe, 2006). I chose mixed methods over qualitative methods as it offered more options, choices and approaches to consider and greater flexibility (Wheeldon, 2010) to answer the research questions. The next section justifies the selection of mixed methods for this study.

#### **4.4.1 Mixed methods**

Mixed methods research was appropriate for this study for four reasons (Creswell & Plano Clark, 2011; Denscombe, 2008; Gray, 2014; Greene, Caracelli, & Graham, 1989). First, mixed methods allow a combination of quantitative and qualitative characteristics in a single study (Creswell, 2014; Gray, 2014). Mixed methods allow researchers to investigate the identified problem from different perspectives, collect diverse types of data, analyse the evidence by using numerous techniques and interpret findings through various lenses (Henn, Weinstein, & Foard, 2009; McKim, 2017). With mixed methods, it is less likely that essential evidence is missed (Johnson & Christensen, 2012). As a result, mixed methods was chosen as it provided a means of accessing a more accurate picture of the issue being studied and to help mitigate the issues associated with being an insider researcher.

Second, a mixed methods approach helps inform the research and answer complex research problems (Denscombe, 2008; Fraenkel et al., 2012). The research questions also guided me towards utilising mixed methods (Johnson & Onwuegbuzie, 2004). In this study, some research questions could be answered by the qualitative methods, while others required a combination of both methods.

Third, mixed methods allow the development of the research design stages (Gray, 2014). The result of one method can be used to inform another method (Johnson & Christensen, 2012). In this study, a survey was utilised in the first stage that informed the interview and observation methods in the second and third stages.

Fourth, mixed methods are used for triangulation purposes (Gray, 2014; Howe, 2012). When using multiple methods to look at the same phenomena, the trustworthiness of results is strengthened (Greene et al., 1989; Lodico et al., 2010; Sarantakos, 2013). Triangulation techniques can be used to explain participants' behaviours by making use of qualitative and quantitative data (Andersson, 2015). In this study, multiple methods (see section 4.5) were used to corroborate the findings.

The mixing of qualitative and quantitative features can be done in diverse ways and to varying degrees (E. Alexander, Eppler, & Bresciani, 2016; Collins, Onwuegbuzie, & Jiao, 2007; Leal et al., 2016; Plano Clark et al., 2013; Weaver-Hightower, 2014). Mixing is conceptualised to occur at different stages of the research process, such as during data collection, analysis and/or interpretation (Creswell & Plano Clark, 2011; Östlund, Kidd, Wengström, & Rowa-Dewar, 2011). Before explaining the mixing of qualitative and quantitative features of this research, the mixed methods research design is explained.

### ***Mixed method research designs***

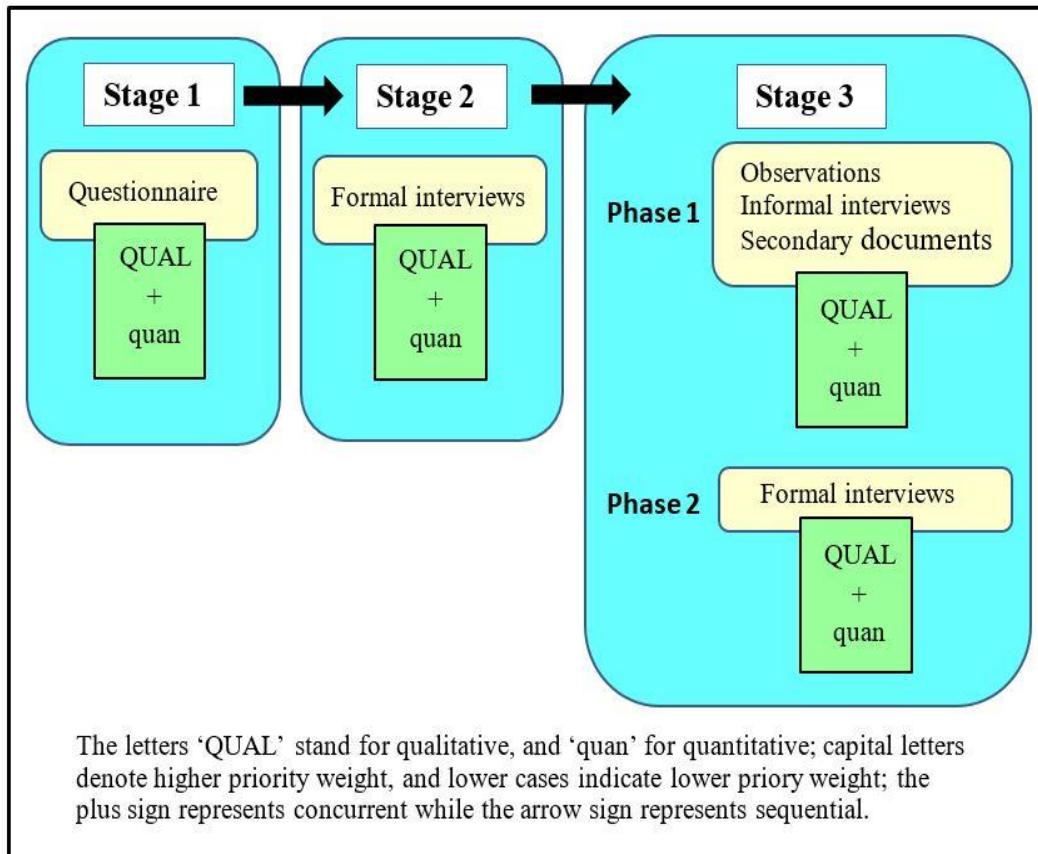
Johnson and Christensen (2012) conceptualise mixed methods research as a function of two decisions related to time orientation and paradigm emphasis. Time orientation (time order decision) indicates when qualitative and quantitative phases occur concurrently or sequentially. Paradigm emphasis means the focus of the two

components can be equal or dominant in status. A multiphase combination timing was used in this study, as my aim was to collect data in several stages and a blend of sequential and concurrent decisions was used.

Four major mixed methods research designs have been identified in the literature and include the convergent parallel (Kerrigan, 2014), explanatory sequential (Ivankova, 2014), exploratory sequential (Stoller et al., 2009) and embedded (Plano Clark et al., 2013; Weaver-Hightower, 2014). An embedded design was used in this study.

In an embedded design, investigators gather and analyse qualitative and quantitative data within a conventional qualitative or quantitative design (Creswell & Plano Clark, 2011; Punch & Oancea, 2014). There are two embedded design possibilities. Either one method (qualitative or quantitative) is embedded as an additive to the central design or procedure (Hilton, Budgen, Molzahn, & Attridge, 2001; Weaver-Hightower, 2014), or both are embedded in a hybrid within the main design or procedure (Luck, Jackson, & Usher, 2006).

An embedded design within a qualitative approach was used in this study as depicted in Figure 4.2. This design was considered appropriate based on the decision of using mixed methods with emphasis on qualitative, which involved collecting data in three stages. My focus of using the extra quantitative data was to better understand the process of ‘assessment for learning’ in D&T.



*Figure 4.2* The data collection methods using mixed methods embedded within qualitative research

The following section elaborates on the methods utilised in this research. Then the sampling procedures are explained, together with the reasons for selecting non-probability sampling.

## 4.5 Methods

This research study employed four methods to collect data: a questionnaire, interviews, observations and secondary documents, as indicated in Figure 4.2. The diagram also shows which method was used at specific stages and phases of this study. The methods are explained next.

### 4.5.1 Questionnaire

A questionnaire is a self-reported data gathering instrument, which can be used to collect information about many different kinds of characteristics (Johnson & Christensen, 2012). A researcher may attempt to obtain information about

participants' thoughts, feelings, values, beliefs, perceptions and behavioural intentions (Johnson & Christensen, 2012). However, a questionnaire is useful only when the respondents are knowledgeable about the area under study and competent to answer the questions (Preston, 2009).

In this study, the questionnaire was the first tool to be administered to D&T teachers. There were several reasons for using the questionnaire method. First, information on teachers was required for selection purposes. For example, teachers' years of experience, the number of schools they had taught in, and whether they taught at Form 3 level (the targeted class level for observations). Second, the teachers' working schedules were required because several teachers taught in two state secondary schools. This information was necessary to organise the teacher interviews. Third, background information on the teachers' initial teacher education and professional learning and development in the area of assessment was needed. Thus, a long and highly structured type of questionnaire was not required.

Several types of questionnaires have been identified from the literature ranging from highly structured to unstructured (Cohen et al., 2011). A semi-structured questionnaire was used (see Appendix D) to gather the D&T teachers' background and experience information, and included closed and open-ended questions.

#### **4.5.2 Interview**

Interviews are used when an investigator plans "collecting facts, or gaining insights into or understanding of opinions, attitudes, experiences, processes, [or] behaviours" (Rowley, 2012, p. 261) in a particular setting. Interviews are helpful when a research study aims to understand the lived experiences of people (Gray, 2014). There are several types of interview techniques, and the type depends on the objectives of the inquiry (Gray, 2014; Johnson & Christensen, 2012; Rowley, 2012). Since I needed to gain a deep insight into teachers' 'assessment for learning' practices, the interview method was chosen.

Two types of interviews were used for this study: semi-structured and informal conversational. The informal conversational interview is the most spontaneous and

loosely structured type of qualitative interview (Gray, 2014; Johnson & Christensen, 2012). With this kind of interview, there are no predetermined questions, but the questions emerge from the context (Johnson & Christensen, 2012). The informal conventional interview was utilised after observation of each teacher to gain a better understanding of ‘assessment for learning’ decisions. These interviews were scheduled at the end of each lesson, with the aim of gaining a better understanding of teachers’ assessment decisions during that lesson. To avoid the loss of valuable evidence, I envisaged audio-recording the informal conversational interviews.

A semi-structured interview is non-standardised (Gray, 2014), meaning that the sequence of questions can be changed to accommodate the interviewee (Rowley, 2012). Questions may be added, removed or modified subject to the evolution of the interview (Gray, 2014). The semi-structured interview was used for teacher and student interviews to allow the probing of respondents’ answers with the intention to explore the subjective meanings (Gillham, 2005) they attributed to ‘assessment for learning’.

Interviews have both advantages and disadvantages. One main advantage is that, when in need of in-depth information, for example, the use of interview produces a better response rate than open-ended questions in a questionnaire, (Gray, 2014; Sarantakos, 2013). However, Rowley (2012) warned that individual face-to-face interviews can be very time-consuming. To counter this issue, group interviews were selected for both teachers and students.

### ***Group interview***

Group interviews and focus groups are terms that are often used interchangeably to refer to a planned discussion (Gibbs, 2012; Punch & Oancea, 2014). During the planned discussion, the shared views from a chosen group of people about a distinctive theme are collected (Gibbs, 2012). However, several authors emphasise the two interview types are not identical (Gibbs, 2012; Gillham, 2005; Gray, 2014; Krueger & Casey, 2015; Patton, 2014). In group interviews, the interviewer mostly interviews participants to gather many opinions about a topic (Gibbs, 2012). However, in focus groups, there is usually a focus question to be answered and the

group may initiate an idea that has not been anticipated by the researcher (Gibbs, 2012) and discussions and interactions are generated within the group (Gray, 2014). Also, Gillham (2005) claims that the content and composition of focus groups are specific, whereas in group interviews, these have a much wider spread. Focus group questions are “carefully predetermined and sequenced” logically to the participants (Krueger & Casey, 2015, p. 7).

In this study, the group interview was chosen over the focus group. First, because limited research was conducted in the area of ‘assessment for learning’ in Mauritius, so broader insights of D&T teachers’ ‘assessment for learning’ practices were needed and the consensus of opinion that a focus group typically seeks was not required (Krueger & Casey, 2015). Second, based on the research design of the study, specific information was required from the interviews that could be compared with observation data. Hence, the group interview provided the flexibility to guide each respondent to answer specific questions and share their opinions.

The group interview has several benefits over the individual interview. Four main advantages have been identified (Fontana & Prokos, 2007). First, it provides rich data that are elaborative. Second, the group interview helps establish an environment to build confidence and rapport, which encourages interviewees to respond. Third, it produces richer data as participants fill in each other’s memory gaps. Fourth, a group interview is comparatively inexpensive compared to an individual interview. Nevertheless, group interviews do have drawbacks (Fontana & Prokos, 2007). The findings cannot be generalised, group culture can interfere with an individual’s view, participants may generate new understandings during the interview through the group process, and some members can overshadow others during the interview (Patton, 2014).

Both teacher and student interviews were key to this study. One essential purpose of the teachers’ group interviews was obtaining background information about D&T teachers’ ‘assessment for learning’ practices in Mauritius. I planned to conduct the interviews in the teachers’ respective schools to encourage them to participate. The purpose of using student group interviews was to learn about students’ conceptions of ‘assessment for learning’ in D&T. Also, student interviews



were helpful to understand and interpret data gathered from the teachers during interviews and observations. Three student group interviews were planned: one group per observed classroom. In accordance with ethnographic interviewing procedures, I provided the interviewees with opportunities and prompts for them to share their own understandings. Teacher interviews were conducted in the English language (see Appendix E), while student interviews were done in the Mauritian Creole language to help students to communicate freely. The questions posed to students are included in Appendix F. All teacher and student group interviews were audio-recorded.

#### **4.5.3 Observation**

Observation in research is defined as the act of witnessing the behavioural patterns of the individual(s) to gain information about the phenomenon of interest in a social setting (Banister, 2011; Cohen et al., 2011; Johnson & Christensen, 2012). The observation method is helpful as it provides first-hand information, so researchers do not simply assume what they are told. Also, ethnographers require “direct observation and being immersed in the field” (Adam, 2015, p. 88) to obtain an accurate description of participants’ behaviours about the phenomenon of interest (Fetterman, 2010).

Observation has several advantages, one being the richness of information gained. Patton (2014) claims that observation takes the researcher into the situation where a good description and thorough understanding of the area under study is obtained. Recording the actual behaviour is valuable because participants do not always behave the way they say they do (Johnson & Christensen, 2012). Moreover, ethnographers can capture the context of the fieldwork which is valuable evidence (Patton, 2014; Sarantakos, 2013). Also, the participant-as-observer can learn about issues that the participants are not willing to share during interviews or that nobody has detected (Patton, 2014). Finally, gaining first-hand experience allows researchers to employ their understandings during the interpretation phase (Stake, 2010), as the researchers’ thoughts and feelings become part of the evidence that describes a setting (Banister, 2011; Patton, 2014).

The observation method does have disadvantages, and there are three major constraints. First, when aware of being observed, the participants may change their behaviours (Johnson & Christensen, 2012; Sarantakos, 2013). The participant-as-observer is used to counter the difficulty of behavioural change (Johnson & Christensen, 2012) where a significant amount of time is spent observing teachers in the classrooms. With time, participants come to trust the researcher and adjust to their presence, so participants who might change their behaviour are more likely to act naturally (Johnson & Christensen, 2012). Second, Banister (2011) states that observation can be labour-intensive, particularly when it creates a massive amount of data that will require a considerable amount of time to analyse. Therefore, investigators should be able to determine how much data is desirable and when to stop gathering it. Third, observation is very time-consuming (Banister, 2011).

There are two main types of observations: non-participant and participant (Gray, 2014). In participant observation, the researcher interacts with the participants in their workplace (Atkinson & Hammersley, 1994; Musante, 2015), while in non-participant observation, the investigator keeps a position of detachment from the participants (Gray, 2014). For ethnographic researchers, participant observation is more appropriate as it allows them to collect comprehensive data by interacting with the participants and recording the discussion information in a diary (Bloor & Wood, 2006; Musante, 2015). This study adopted an ethnographic methodology and therefore participant observation was used as it allowed collecting valuable in-depth information.

Both qualitative and quantitative observations were used for this study. Usually, quantitative approaches to observation are highly structured, needing pre-established observation schedules (commonly very detailed), whereas qualitative approaches are more unstructured (Punch & Oancea, 2014) because these are mostly used for exploratory purposes. Accordingly, qualitative approaches entail observing and taking field notes related to the research questions (Johnson & Christensen, 2012). However, observation data can be highly structured without fundamentally being changed into numbers because the issue of structure is rather how much structure the observations would entail (Punch & Oancea, 2014). This study followed an ethnographic methodology and adopted a structured observation

approach to collect qualitative data. Hammersley and Atkinson (2007) use the term ‘funnel structure’ to refer to the progressive structure of ethnographic research. The structured observation was based on pre-established categories where teachers’ ‘assessment for learning’ behaviour was broken up into small parts, as shown in Appendix G. A rubric table was also used as a guideline to identify the ‘assessment for learning’ categories (see Appendix H).

Quantitative observations usually result in numerical data such as percentages, frequencies and counts (Johnson & Christensen, 2012). All observational procedures within a study need to be standardised to obtain reliable data in quantitative research studies (Johnson & Christensen, 2012). For example, who will be observed, what variables will be observed, and when and where observations will take place. In this study, all classes/lessons that were observed were audio-recorded to collect the quantitative data that were analysed at a later stage.

Teachers of different years of service were observed in about 10 teaching sessions. Sequential observations were carried out to have richer evidence of ongoing classroom assessment activities conducted by the teachers. Field notes, visual data (images) and secondary data were gathered, as explained next.

Field notes allow a broad range of data to be collected (Morrell & Carroll, 2010). In this investigation, the field notes were used to record my “reactions to the experience ... reflections about personal meanings and significance of what [was] observed” (Patton, 2014, p. 388). Therefore, note taking was performed in an attempt to describe the observations.

The image is believed to be another rich form of data collection (Johnson & Christensen, 2012). In this study, the whiteboard, A3 papers and textbooks used during the teachers’ ‘assessment for learning’ practices were photographed as were teachers’ teaching and assessment plans.

#### **4.5.4 Secondary data**

Secondary data are existing evidence that are utilised for another purpose than the current research study (Gray, 2014; Johnson & Christensen, 2012; Smith, 2012). Secondary data can take different forms, such as numeric (quantitative) or non-numeric (qualitative) (Smith, 2012).

For this study, non-numeric secondary data, such as personal and official documents, were used. Personal documents are records that are written, photographed or otherwise registered for private purposes (Johnson & Christensen, 2012). The personal documents used for this study were the teachers' documents, such as yearly, weekly and daily plans (lesson plans), posters and lesson activities. These personal documents revealed how D&T teachers planned assessment activities. The personal documents were collected only from the teachers who were observed.

Official records, also termed as private documents, can be for either public or private purposes (Johnson & Christensen, 2012). In this study, I planned to use several official documents from two departments of the Ministry of Education (MOE); first, to gain an understanding of teachers' assessment knowledge, and second, to learn how the assessment practices of teachers were monitored, which could be used for triangulation purposes.

The next section elaborates on the sampling procedures of the study. The types of sampling used for each stage are also discussed.

#### **4.5.5 Sampling procedures**

Two types of sampling strategies were identified in the literature: probability sampling and non-probability sampling (Cohen et al., 2011; Gray, 2014; Sarantakos, 2013). Non-probability sampling was used as it suited the mixed methods embedded qualitative design of this study. Within non-probability sampling, some members of the population are categorically excluded from the sample (Cohen et al., 2011).

Selecting non-probability sampling for this study facilitated the management of the data collection procedure within the set period. The participants of this research were D&T teachers, and Form 3 students studying D&T in state secondary schools. Pseudonyms were used for all schools, teachers and students. The type of sampling used under each stage of this research is elaborated in the next section.

### ***Stages one and two***

Convenience sampling, which is about gaining access to the most accessible participants (Gray, 2014), was used to select the state secondary schools in the first and second stages. Two reasons for this selection were curriculum implementation and accessibility. First, the state secondary schools follow directives from the MOE and so some uniformity was expected in the implementation of the curriculum. Second, state secondary schools in Mauritius were more accessible for research than private schools.

In the first two stages, I focused on 15 state secondary schools involving 44 D&T teachers. Fifteen schools were selected based on the geographical location and by considering the amount of time that would be spent travelling to these sites. In stage one, all potential teacher-participants were asked to complete a questionnaire. From this group, three teachers were identified for Phase 1 of stage three, as indicated in Figure 4.3. The questionnaire information was also used to organise the group interviews of stage two.

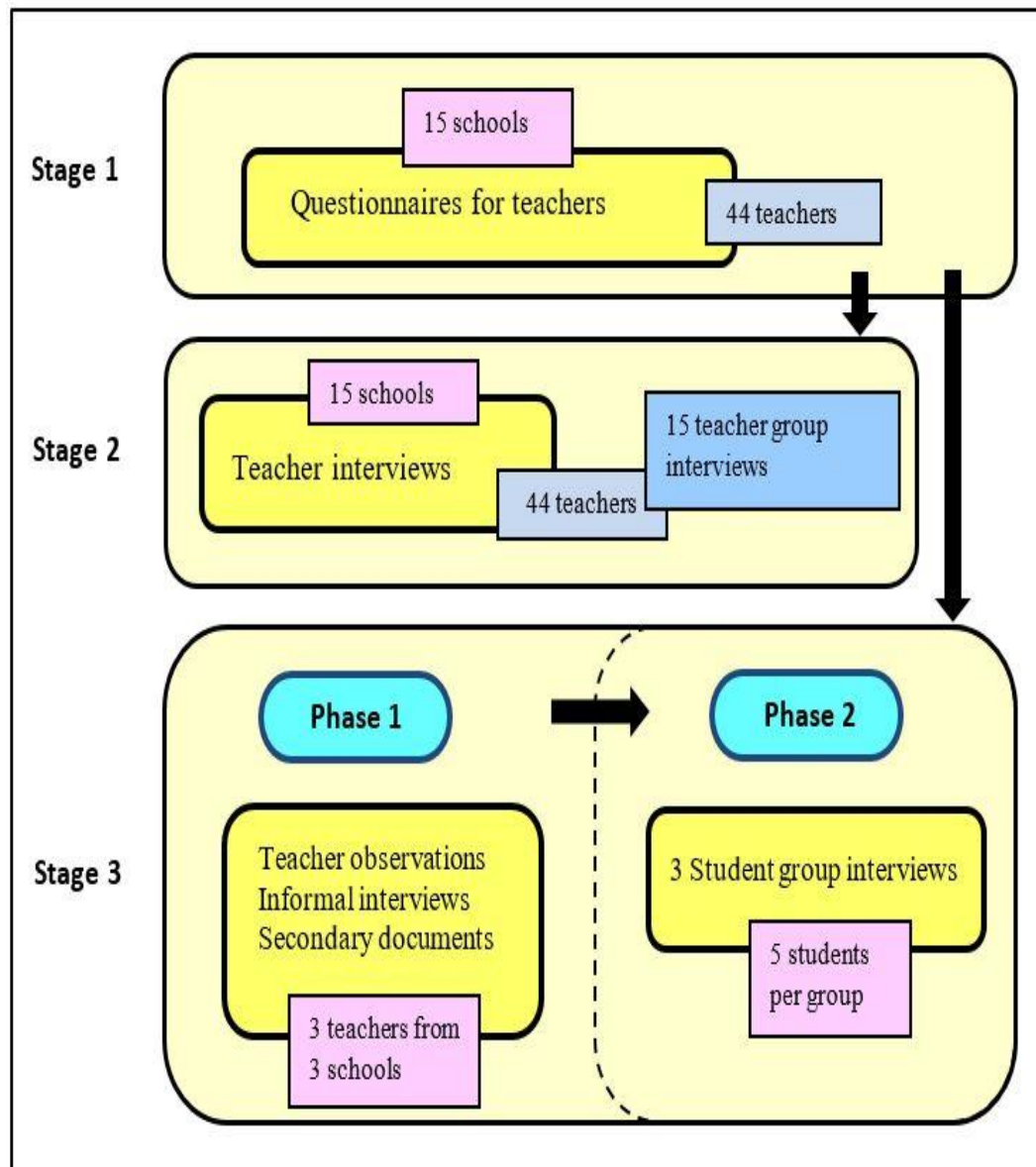


Figure 4.3 Planned stages, methods, and samples for the study

### **Stage three: Phase one**

Purposive sampling is about the deliberate designation of participants by the researcher who considers the sample relevance for the study (Cohen et al., 2011; Gray, 2014; Sarantakos, 2013). Several types of purposive sampling were identified: typical case, extreme case, intensity, maximum variation, homogeneous, reputation, revelatory case and critical case (Cohen et al., 2011; Gray, 2014; Sarantakos, 2013).

Maximum variation sampling was used for Phase 1 of the third stage of this study. In maximum variation sampling, a diverse range of participants in connection with

the issue concerned is selected (Cohen et al., 2011; Gray, 2014). The purpose of the maximum variation sampling is to illustrate the main themes across different cases (Gray, 2014). In this study, three D&T teachers were selected based on their range of teaching experience: least, moderate and most number of years of teaching experience. These teachers came from different state secondary schools and data were gathered from observations, informal interviews, field notes and secondary documents as indicated in Figure 4.3.

### ***Stage three: Phase two***

Convenience sampling was utilised in Phase 2 of the third stage of the study. Five students from each of the observed classrooms were selected (as explained in section 4.5.6) to participate in the three group interviews as shown in Figure 4.3. Since the students were familiar with the study and consent had been gained, as well as the study explained, it was convenient to select student participants from the observed classrooms.

The next section elaborates on the data collection procedures. The section begins by describing how access was gained, followed by how data were collected during the three stages.

#### **4.5.6 Data collection procedure**

Although I was an insider researcher in this ethnographic research, things did not entirely go according to initial plans. Figure 4.4 shows changes to the three stages of data collection, methods used, samples and schools involved and the number of interview groups. In this section, I elaborate how I experienced both motivating and challenging occurrences when requesting access and consent as well as gathering data.

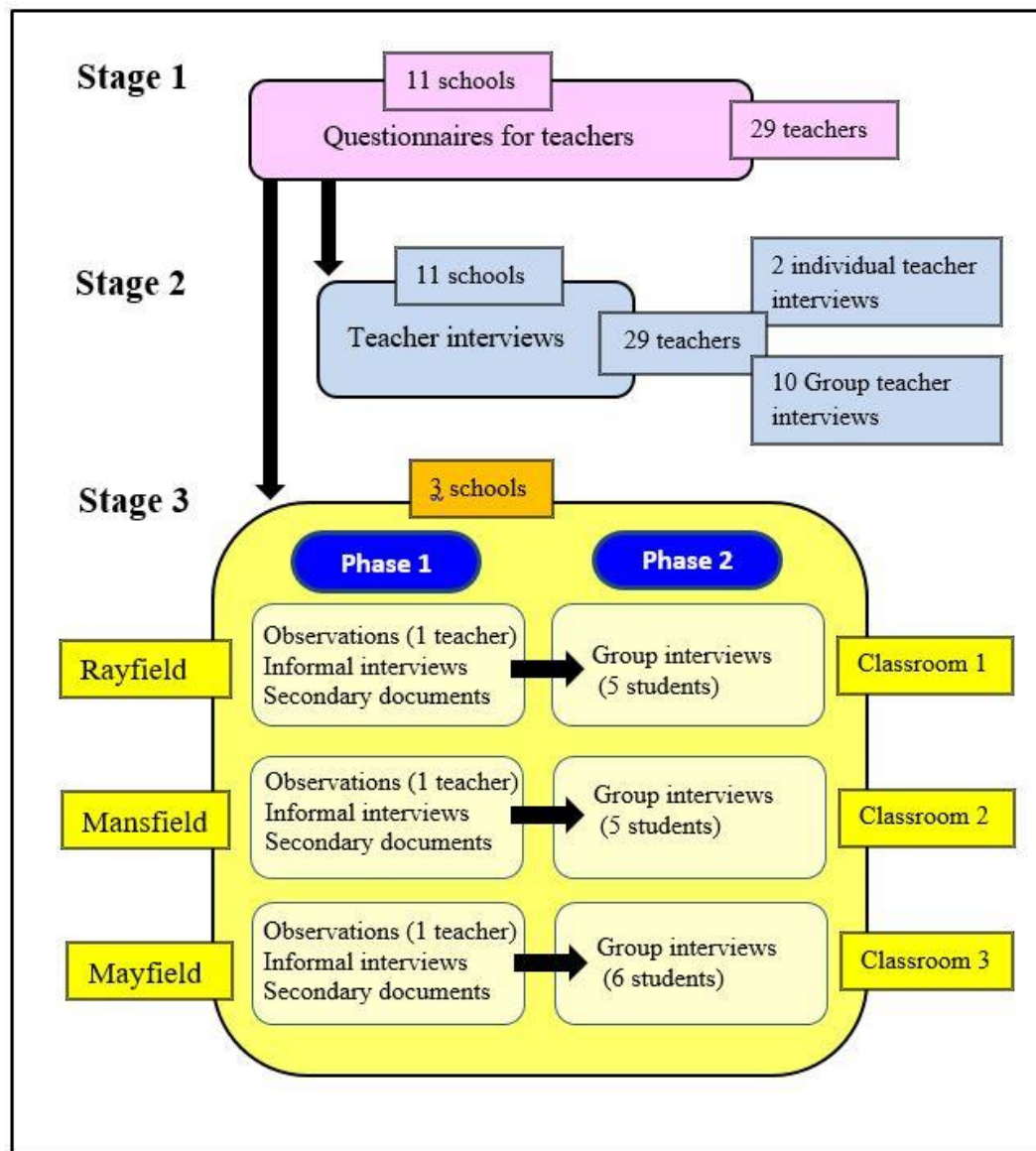


Figure 4.4 Data collected by stages, methods, and samples

### Gaining access

The chosen sites for the research study were state secondary schools. Thus, before entering the schools, permission from the MOE was required (see Appendix I). However, before being granted permission, an officer from the MOE contacted me and asked me to provide a sample of interview questions that would be presented to participants. I seized this opportunity to go and meet the officer and gain additional information about the procedures for gaining access. I was informed that the approval committee at the level of the MOE was interested in examining the interview questions, and in the case of any disagreement, the committee would ask me to rephrase or change the interview questions. Eventually, the interview



questions were approved and permission granted (see Appendix J). However, I was asked to submit a report to the MOE, of the research outcomes upon its completion.

Once approval was acquired from the MOE, permissions were sought from principals (see Appendix K). Out of 15 principals, approval was gained within one day from nine principals and within one to two weeks from four principals. However, the delayed approval from one principal (from Chesterfield) meant that data could not be collected from one school.

Gaining the permission of another principal (from Fairfield) took nearly one month. The delay occurred mainly because this principal asked for a report on teacher observations, which could not be provided for ethical reasons. The delay in gaining access at this school meant that its teachers could only take part in the teacher interview at stage 2 since three teacher participants had already been identified for observations at stage 3.

### ***Gaining teachers' consent***

Once permission was gained from principals, the teachers of the 14 schools were approached and briefed about the research. Before the 41 teachers were contacted, each school's administration was requested to schedule a meeting with their D&T teachers for a briefing session. On the first day, teachers were briefed about the research, presented with research guidelines (see Appendix L), the consent form and interview questions (see Appendix E), and informed of associated risks and benefits involved in the research study. In each of the 14 meetings, the D&T teachers were given the opportunity to ask questions about the research. I expressed gratitude to all the concerned teachers and thanked them in advance for their support.

Most of the teachers' consent forms were received within one week. However, there were some delays due to unforeseen difficulties. In four schools, not all teachers were present at the meetings. In two schools, teachers were recruited late, and in another two schools, a few teachers were absent. As a result, I had to re-visit the concerned schools and brief the four teachers individually. In some cases, when the consent forms were collected, the teachers claimed that they had left the signed

consent forms at home, lost the forms, or did not have the time to go through the guidelines and would sign the documents the next day. Because of the principal's delay in allowing access to Fairfield, there were further delays in gaining teachers' consent forms. At Greenfield, I waited for nearly three weeks for a teacher's decision to participate. However, I was later informed that the concerned teacher was reluctant to participate in the research.

At Mayfield, I faced an entirely new situation. The head of the department claimed that his team did not teach D&T but Design and Communication (D&C), and he did not agree with the term D&T because there was not a proper specialist D&T room at the school. The head of the department was agreeable for his team to participate but only if I informed him in writing that the research would be conducted for D&C, which I agreed to (see Appendix M).

Not all D&T teachers who were invited to participate in this study accepted the invitation. Out of the 41 teachers, 11 teachers chose not to be involved. Table 4.1 shows the schools where permission was granted and the number of teachers who agreed to participate.

Table 4.1 *The Number of D&T Teachers Agreeing to Participate, by Schools*

School (pseudonym)	Total number of teachers	Teacher consenting to participate	Number of teachers for group interviews
Petersfield	2	1	1
Banfield	3	3	3
Canfield	4	2	2
Garfield	2.4	2.4 *	2
Rayfield	3	3	3
Fairfield	2.6	2.6 *	3
Sheffield	3.4	3.4 ^	3
Mansfield	3	3	3
Greenfield	2.6	1.6 ^	2
Coldfield	2	2	2
Redfield	4	3	3
Mayfield	3	3	3
Hatfield	3	0	-
Ashfield	3	0	-
<b>Total</b>	<b>41</b>	<b>30</b>	<b>30</b>

*Note.* The signs \* and ^ show that some teachers taught in two schools.

The middle two columns of Table 4.1 indicate four rows with decimal values. The decimal values reveal that the indicated schools had part-time teachers. For example, 0.4 means a teacher worked two out of five days, and 0.6 means a teacher worked three out of five days.

There were two part-time teachers, who each worked in two schools. It was not convenient to interview a teacher twice, so each part-time teacher was interviewed in the school where they taught on three days. Requesting the two teachers to participate in group interviews at the designated schools, as shown in the last column of Table 4.1, prevented the possibility of ending with only one participant at Greenfield.

### ***Questionnaire***

The D&T teachers who agreed to participate in the study returned the consent forms and questionnaires together. Due to the delay by four teachers to return the questionnaires, which were needed to select teachers for observations, I began the selection process and had to discard those teachers from the observation selection list. In addition, when verifying the questionnaire responses, I found that two respondents left one question unanswered. Through informal conversations, these answers were obtained from the concerned participants.

### ***Pilot study***

The teacher questionnaire, interview questions, and observation protocol were piloted before the actual data collection. The questionnaire was trialled with two English-language teachers from Petersfield and two other researchers in Mauritius and was improved as a result.

The teacher interview questions were piloted at Petersfield with one D&T teacher, who gave an indication of expected teacher responses and plausible prompts if required. An analysis of the teacher interview transcript also helped reorganise the interview questions.

I piloted the teacher observation protocol in four schools, but for two different purposes. An initial pilot of the teacher observation protocol was done at Redfield. This trial permitted me to identify some difficulties concerning the use of audio-recording in a classroom, and it led me to make provision for a pocket recorder for the observed teachers. In addition, the first lesson of each observed teacher in three schools was piloted to allow the teachers and students to familiarise themselves with my presence in their classrooms, as well as allow myself to become familiarised with the surroundings.

### ***Teacher interviews***

I was conscious of the amount of time that would be spent conducting teacher and student interviews but underestimated the time required for underlying issues related to interviewing. Gillham (2000) states that much time is spent with the interview method, such as developing and piloting interview questions, travelling to the locations, transcribing interviews and analysing the data.

The interview meetings at the 12 state secondary schools (including one pilot school) offered diverse experiences. In nine schools, teacher interviews (one individual and eight group interviews) occurred as planned; however, I faced several difficulties in three schools. First, there was one rescheduling due to the absence of participants (Sheffield). Second, rearrangement was needed because of the unavailability of the participants due to the rigidity of the timetable (Redfield). Third, and the most challenging, two teachers who had agreed to participate in the group interview, were unwilling to be interviewed together (Coldfield). Thus, the two teachers were interviewed individually. Table 4.2 shows the number of teacher interviews conducted and the type of groupings done for this study.

Table 4.2 *The Number of Teacher Interviews by Types*

Interview types	Number of teacher interviews
Individual	3
Pair	3
Triad	7

### ***Selection of teachers for observation***

The selection of three teachers for observation was based on several criteria and was completed in two steps. In the first step five criteria were used to eliminate teachers who were not suitable, as shown in Table 4.3. Nine teachers satisfied the criteria.

Table 4.3 *Five Criteria Used to Eliminate Unsuitable Teacher Participants*

	Number of teachers
<b>Criteria for eliminating teachers: Step one</b>	
Teachers on contract (temporary)	5
Teachers (permanent) not teaching Form 3	5
Teachers not willing to be observed	4
Principals not supportive	4
Teachers not supportive	2
<b>Appropriate for observation</b>	9

*Note.* The four teachers who returned their questionnaires late were included in the categories of principals not supportive (three) and teachers on contract (one).

The second step involved choosing three out of nine teachers. The selection was based on gaining a range of teachers' years of teaching experience and their Form 3 class schedules (see Appendix N). As mentioned earlier, teachers from three different schools were selected: Mansfield, Rayfield and Mayfield. The three selected teachers had 4–8, 11–15 and 18–22 years of teaching experience, respectively.

### ***Teacher observation***

At the schools where observation was conducted, I was confronted with various difficulties. First, the students' names had to be recorded and remembered. It was important to ensure that the students who had not consented to participate in the study did not have their copybooks/scripts photographed. Second, changes and postponement of teaching sessions in all three schools led to adjustments of my observation plans. For example, at Mansfield, due to morning school assemblies, one class was postponed, and two classes were shortened.

### ***Informal interviews***

I had planned to audio-record all the informal conversation interviews after the lessons, but realised that some valuable information can be obtained when the recorder is not used and that such conversations could be written in a reflective diary. However, the recorder was left on, and thus some informal interviews were audio-recorded. This indicates the positive rapport I had with my participants.

### ***Reflexive notes***

Since I was an insider, I faced a few challenges. The primary strategy to address the insider's challenges was to be reflexive (Adam, 2015). Reflexivity refers to a researcher's ability to move back from the research process and critically examine their beliefs, practices and judgements which may influenced the process (Hammond & Wellington, 2013; O'Leary, 2014). Reflexivity allows researchers to understand how their knowledge is constructed (Takeda, 2012) and question assumptions that could be taken for granted (Hammond & Wellington, 2013). In this study, I had to be reflexive and separate my professional knowledge of evaluating teachers' practices. Throughout the study, I kept a diary in which I wrote my reflective notes.

### ***Gaining permission from parents and students***

Once teachers were identified for observation, students of the three classrooms were approached and briefed on the research. On the first day, students were briefed and provided with research guidelines (see Appendix O), consent forms and interview questions. Students were also given research guidelines (see Appendix P) and consent forms to hand to their parents. All the students were informed of associated risks and benefits involved and were given the opportunity to ask questions concerning the research. Students were asked to inform their parents that they were welcome to make enquiries if they had any concerns.

Most of the students' and their parents' consent forms were received one week after they were briefed about the research. The students who were not willing to participate informed me within the same week. However, some students delayed in

submitting their consent forms, and I had to remind them on several occasions. These students returned the consent forms after nearly three weeks.

### ***Student interviews***

Before carrying out student interviews at the three identified schools, some procedures had to be followed. Each school administration was asked to determine the day, time and location for the interviews and to inform the student-participants concerned.

Five students were required for each interview session. The selection was made by the D&T teachers based on their subjective judgement of the students' performance. Since Mayfield was a mixed gender school, I requested the teacher to include two or three girls in the student interview group. At Mansfield, seven students agreed to participate in the research. However, after three weeks, one student moved to another class. Thus, six students remained. Accordingly, I invited the six students to participate in the group interview.

### ***Transcript approval***

Transcription approval was done for both teachers and students. For students to approve the transcripts, each school administration was again requested to reserve a day, time and location. Participants were informed that editing of their transcripts was allowed, but not those of their friends or colleagues. Once the interviews were transcribed, the participants read and approved the transcripts. All participants signed the transcripts and transcript release forms (see Appendix Q) without any disapproval. In most cases, approval was given as a group.

### ***Secondary data from the Ministry of Education's departments***

To access secondary data from the MOE's departments, I requested permission from the directors of two bodies. A letter was sent to those in the position of authority. However, no response was obtained from the respective directors, which meant that potential secondary data from these departments could not be used.

## 4.6 Data Analysis

This section explains how data were organised, analysed and presented in this research study. The section also explains how the NVivo 11 computer software was used to help analyse the data.

In this study, both descriptive statistical and thematic analyses were used. Descriptive statistical analysis was used to convey essential characteristics of the quantitative data obtained from the questionnaire, interviews and classroom observations (Welsh, 2012). Thematic analysis, a technique of recognising and analysing patterns or themes within data which is identified by coding (Clarke & Braun, 2014; Gray, 2014; Saldaña, 2016; Sarantakos, 2013), was used to analyse the qualitative data. A theme becomes important when it captures significant issues associated with the general research question (Gray, 2014). A theme can be the outcome of analytical reflection, categorisation or coding (Saldaña, 2016).

Qualitative analysis began with the identification of codes, categories and themes. Coding allows the researcher to transform data into logical forms, then search and retrieve data bearing the same code (Cohen et al., 2011; Grbich, 2013). Coding is a technique to arrange things into a systematic order (Saldaña, 2016) that aids in creating categories (Sarantakos, 2013). Codes can be general or specific and may subsume more than one category or subcategory (Saldaña, 2016). During coding, one looks for patterns that demonstrate people's daily habits. In this study, I looked for the D&T teachers' 'assessment for learning' habits. Pattern is a recurring or consistent occurrence of action or data that happen more than twice (Saldaña, 2016). Patterns are the foundation for themes (Patton, 2014).

Yin (2014) suggests that when preparing for data analysis, it is best to have a general analytic strategy to capture themes. Two general strategies, the inductive and descriptive framework (Patton, 2014; Yin, 2014) were used to analyse data in this research. The inductive analysis involves researchers interacting with data to determine patterns, themes and categories from the evidence gathered (Lincoln & Guba, 1985; Patton, 2014; Yin, 2014). Through ongoing interactions with the patterns, themes and categories, findings emerge which generate new concepts,



explanations and/or theories of a qualitative study (Patton, 2014; Saldaña, 2016). In contrast, with deductive analysis, data are analysed and organised based on an existing descriptive framework (Patton, 2014; Yin, 2014). When engaging in deductive analysis, the degree to which the evidence of the qualitative study supports existing conceptualisations, explanations and/or theories is determined (Patton, 2014).

Yin (2014) recommends designing the data collection instruments by considering the literature review to ensure the appropriate data is collected. It is possible to use a descriptive approach to identify appropriate explanations even if the initial purpose was to not use this approach for the analysis (Yin, 2014). Consequently, when designing the data collection instruments for this study, a descriptive framework was used.

There are different ways of organising and presenting findings in research studies (Cohen et al., 2011). In this study, the findings are organised by instruments. First, the teacher interviews are presented. This is followed by the analysis of teachers' classroom practices, and finally, student interviews are presented. Cross-method analyses were done by issue and carried out iteratively when codes, categories and themes were identified until the themes and sub-themes of the three chapters were finalised.

Several software programmes have been specifically designed to analyse qualitative data (Gray, 2014). In this study, all transcribed data and audio-recorded data were uploaded to the NVivo software, which was utilised as my data management tool. Coding of the key ideas was done separately for each instrument using NVivo 11.

In this study, Saldaña's (2016) first and second cycle coding methods were used to analyse data, which was achieved with the use of memos. I created initial codes by using the first-cycle methods by working iteratively; the data, categories and codes were revisited multiple times. Eventually, the initial codes were altered when new codes emerged as the analysis progressed. Then second-cycle coding methods were used, which is an improved way of reorganisation and reanalysing data coded during the first cycle (Saldaña, 2016). NVivo memos were used to assist in data

analysis. These memos support investigators to reflect and generate further ideas for analysing qualitative data (Bazeley & Jackson, 2013). The memos used in this study were related mostly to my field note entries and reflexive notes.

Ethical considerations were another critical issue that I needed to address when planning this research. The next section explains how the ethical issues within this investigation were addressed.

## **4.7 Ethical Considerations**

Ethics are sets of principles, such as morality, integrity and the distinction between right and wrong, which guide the actions and behaviours of people involved in research (Bloor & Wood, 2006; Hammond & Wellington, 2013). I sought permission from the University of Waikato Human Research Ethics Committee (see Appendix R) to successfully deal with ethical issues within this research study.

Ethical principles that are pertinent to this study include privacy, confidentiality, professionalism, doing no harm, and informed consent (Beauchamp & Childress, 2009; Freeman, 2011; Kitchener, 1984). The steps taken to prevent ethical issues from arising have also been highlighted.

When participants are involved in any research, their right to privacy must be respected throughout the study (Hammersley & Atkinson, 2007; Sarantakos, 2013). C. Marshall and Rossman (2016) claim that an individual has the full right not to: (a) participate in an inquiry, (b) answer questions, (c) provide personal details, and (d) engage in discussions and participate in observation activities. To cater for the right to privacy, all participants in this study were notified of their rights before collecting data and informed that their participation was voluntary and their decisions would be respected.

Confidentiality is an agreement between the researcher and the participants, where the researcher accepts not to reveal private information to individuals who are not concerned with the investigation (Cohen et al., 2011). Accordingly, to maintain confidentiality in this research, pseudonyms were used for the schools and

participants involved. The participants were also briefed to maintain confidentiality. For example, before conducting group interviews, the participants were requested to keep the content of the interview confidential.

Professionalism is based on the principle of mutual confidence, where respect and relationship are the foundations between the researcher and participants (Cohen et al., 2011). In this study, the participants were assured that information provided would be treated with honesty and respect.

Researchers have an ethical obligation to protect their participants from harm throughout the research process (Sarantakos, 2013). A researcher has the ethical and moral responsibility to protect every participant from physical, psychological, emotional, personal, social and professional harms (Cohen et al., 2011; Hammersley & Atkinson, 2007). In this study, the potential harm that could affect participants was identified and pre-planned procedures were followed to minimise any risk.

Harm may be caused by a researcher interfering with participants' personal lives, time plan and space (Lichtman, 2013). Based on my past experiences, I was aware that state secondary school teachers had rigid timetables, and taking too much of their time and space could harm them. Therefore, care was taken to ensure that teachers were informed before visiting them at the schools. In the case of any unforeseen difficulty, arrangements for future meetings were made. Another way of protecting participants from harm was gaining their consent (Fraenkel et al., 2012).

Informed consent has two components which include informing and consenting (Mayne, Howitt, & Rennie, 2016). Informing implies potential participants must understand the research study and what it means for them to be involved. Consenting purports participants must respond to the researcher (Cocks, 2006). Only when these two components are combined, does an investigator gain informed consent.

Researchers are required to provide adequate information to participants through informed consent documents (Picardi & Masick, 2014). In this study, vital information was inserted into the informed consent documents (see Appendices C to E). For example, the purpose of the research, procedure to be followed, research duration, potential risks and benefits to participants, the researcher's contact information, and how data would be used (Banister, 2011; Hammersley & Atkinson, 2007; Picardi & Masick, 2014) were provided to all participants of this study.

Informed consent was required from a range of people and was obtained in four rounds. First, the MOE's permission was required as the research was conducted in state secondary schools. Second, the principal's permission for each concerned state secondary schools was needed. Third, teachers' consent and finally, students' and their parents' consent were required.

When conducting research, investigators should consider the issue of the quality. The next section explains how I maintained quality (trustworthiness) in this research.

## **4.8 Maintaining Trustworthiness**

Some investigators, mainly from the naturalistic perspective, argue that the criteria for evaluating qualitative studies differ from those for quantitative research, and that trustworthiness is viewed as more appropriate than validity and reliability (Flick, 2014; Gray, 2014; Lincoln & Guba, 1985; Lodico et al., 2010; Sarantakos, 2013). As this study used mixed methods with an emphasis on the qualitative paradigm, the elements of trustworthiness used were credibility, dependability, transferability and confirmability.

Credibility is referred to the researcher's ability to accurately represent participants' thoughts, feelings and actions, and the processes that influenced these thoughts, feelings and actions (Lodico et al., 2010; Merriam, 2009). Evidence of credibility can be gained in different ways, such as researcher-participant relationships, triangulation, peer review and member check.

The engagement of the researcher “in repeated, prolonged and substantial involvement in the field” (Lodico et al., 2010, p. 170) is a sign of nurturing healthy relationships with the participants. When the researcher and participants are involved in profound interactions, credibility is enhanced (Lodico et al., 2010). In this study, I knew most of the teacher participants and shared a good relationship with them. To improve the researcher-participant relationships, considerable time was spent in the field.

Credibility can be enhanced through triangulation (Marshall & Rossman, 2016). As a result, several methods of data collection were used to corroborate the findings of this study, which helped to improve the credibility of the findings as discussed in section 4.4.1.

Another strategy to improve credibility is member checks (Lodico et al., 2010; Merriam, 2009). In member check, the participants are asked to review their own subjective perspectives thus preventing the researcher’s own biases when interpreting findings (Lincoln & Guba, 1985). In this research, participants were invited to approve the formal interview transcripts. In addition, informal interviews were used to clarify teachers’ decisions during classroom observations.

Dependability refers to whether an independent auditor could follow the procedures and processes of a research study to collect and interpret the data (Flick, 2014; Lodico et al., 2010). An auditing process is often used to explain how data were collected, categories derived, themes identified, interpretations made and decisions taken (Flick, 2014). In this study, an auditing process was drafted for tracking purposes (see Appendices A to S) and the coding categories and themes were discussed and critiqued with supervisors.

A technique to support dependability is the use of recording devices (Lodico et al., 2010). In this study, formal interviews and observations were audio-recorded. Other documents, such as transcripts, observation journals, field notes, photographs and secondary documents, were protected and are available for verification.

Transferability is referred to as “the degree of similarity between the research site and other sites as judged by the reader” (Lodico et al., 2010, p. 173). Even if one does not intend to generalise their findings to other settings, naturalistic researchers argue that it is up to the reader, and not the investigator, to decide whether the findings are transferable (Lincoln & Guba, 1985; Lodico et al., 2010; Polit & Beck, 2010). Transferability is not about a representative sample but how well information is provided for readers to understand whether similar procedures and processes of the research may be used in their own settings (Merriam, 2009; Scott & Morrison, 2007). To allow readers to judge whether this particular research was transferable to their contexts, rich, clear and detailed information was provided.

Confirmability refers to the research process to be free from personal bias and prejudice (Gray, 2014; Sarantakos, 2013). Confirmability can be achieved through, for example, continuous checking of interpretations and through reflexivity. Continuous checking of the investigator’s own thoughts and feelings is critical to ensure the credibility of a study (Lodico et al., 2010). For example, when observations are interpreted, the researcher’s ability to capture the true reality might be susceptible to biases. In this study, I used reflexive field notes to monitor my own subjective perspectives and biases regularly. When data were interpreted, I was conscious of my status as a researcher and assessment lecturer, but I tried to think and analyse things from the teachers’ perspectives.

## **Summary**

This chapter outlined the research methodology and methods that were used in this research study. Associated with the methodology and methods were the epistemology, ontology and theoretical perspectives, which were explained and justified. This chapter also clarified how data were gathered and participants selected. The last sections addressed the trustworthiness of this research and explained how ethical issues were addressed.

The next three chapters outline the findings, which have been presented based on the instruments used: teacher interviews (Chapter Five), teachers’ practices in the classroom (Chapter Six) and student interviews (Chapter Seven).



# CHAPTER FIVE

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## TEACHER INTERVIEWS

This chapter uses the framework presented in Chapter Four (Methodology) to analyse the Design and Technology (D&T) teachers' 'assessment for learning' practices in Mauritius state secondary schools. For ease of analysis, the data in this study were separated into three parts and part one is reported in this chapter (Chapter Five: Teacher interviews). The intent of the teacher interviews was to gain an insight into the D&T teachers' 'assessment for learning' practices.

Overall, 30 D&T teachers (27 males and three females) from 12 state secondary schools participated in 10 group and three individual the interviews. Six teachers did not possess a teaching qualification. The duration of each interview varied between 15 to 40 minutes (see Table 11.1 of Appendix S), depending on the number of participants involved, the speaking speed of the teachers and the amount of information they were willing to share. The first interview, involving one teacher from Petersfield, was used as a pilot and is not included in the findings. Teacher interviews were conducted in English and were audio-recorded, transcribed and approved by the participants. Wherever quotes from the transcripts are used, an audit trail was implemented. Accordingly, the code number of the interview and of the teacher, and the page number of the transcript were indicated after each quote (see Appendix S for further details). For example, I2.T1:6 refers to a citation from Interview 2 with Teacher 1 and appearing on page 6 of the transcript. Pseudonyms were utilised to prevent teachers' identification.

The chapter is divided into four sections, and each section presents a theme informing how the D&T teachers enacted 'assessment for learning'. Both inductive and deductive strategies were used to capture themes that emerged from the teacher interviews. First, the inductive analysis was utilised to interact with the data to determine the categories and patterns (the relationship between codes, categories, pattern and themes were explained in section 4.6). Second, in the last two sections, a deductive analysis approach was used to capture the themes; these were derived



from the literature review by using Sheppard's (2000) ideas of evaluating and improving teaching (see section 2.1.2) and Warwick and colleagues' (2015) five key strategies of 'assessment for learning' as guidelines (see section 2.1.6). The themes and sub-themes were developed through analytical reflection and categorisation of the participants' views of 'assessment for learning' (Saldaña, 2016). Descriptive statistical analyses were undertaken by using Excel with the intent to identify important characteristics of the quantitative data obtained from the interviews. The statistics (percentages) displayed in this chapter represent the viewpoints of the 29 teachers (from 11 schools) involved in the interviews. The NVivo software was used to facilitate the analysis of teacher interview data.

Four themes were identified by utilising the first and second cycle coding methods proposed by Saldaña (2016). Initial codes were created by using the first cycle methods (grammatical, elemental, affective, and exploratory methods, and theming the data), which were modified as new codes emerged. The emerging codes were reorganised and reanalysed by using the second cycle coding: pattern and axial coding. Four broad themes emerged from the teacher interviews analysis and these themes were key focus areas of the D&T teachers' assessment practices: preparing students for examinations, completing administrative duties, refining teachers' practices and enhancing students' learning.

## **5.1 Preparing Students for Examinations**

The teacher interview findings revealed that the D&T teachers' 'assessment for learning' practices in Mauritius were framed by the following: teachers' understanding of 'assessment for learning', their beliefs and habits of assessment practices, and the country's examination-oriented education system. The findings under this theme helped to understand how the examination-oriented system directed teachers to adopt and reject assessment methods and guidelines when enacting 'assessment for learning'.

The teachers highlighted that various examinations were conducted in D&T. There were internal examinations, such as, at the end of the second and third terms and

mock examinations, as well as external examinations, such as, the Cambridge International Examinations.

According to the teachers, there were two main reasons for conducting internal examinations. First, to obtain marks for administrative purposes (discussed in section 5.2) and second, to prepare students for other examinations. Teachers considered that the internal examinations were appropriate to prepare students for the Cambridge International Examinations, which included the School Certificate (SC) and Higher School Certificate (HSC) examinations. For example, Catelyn explained,

... how will we identify if our students are good? If the students opt for Design and Technology and they are not good, then the result will be catastrophic for SC. That is why I think it is good to know ... if they are good or not. (I4.T2:6)

The number of internal examinations performed in the 11 state secondary schools differed. The differences were at Form 1 to Form 4 and Lower 6 classes. In three schools (involving eight teachers, 28%), two examinations were carried out each year, at the end of the second and third terms. In the other eight schools (involving 21 teachers, 72%), only third term examinations were carried out each year. However, the timing and number of mock examinations were the same in the 11 schools. Mock examinations were carried out at Form 5 and Upper 6 levels and were organised during the second term with the explicit aim of preparing students for the SC and HSC examinations.

The D&T teachers in Mauritius used various means to prepare their students for the internal and external examinations. As a result, teachers' assessment practices were shaped by their intentions of preparing students for examinations. The following sub-themes explain how the D&T teachers conducted assessment principally to prepare their students for the examinations by conducting regular tests, working on questions from previous Cambridge International Examinations, and using documents as guidelines.

### 5.1.1 Regular tests

The D&T teachers conducted tests regularly with the intention of preparing their students for examinations. The teachers set different types of tests described as small, big, theoretical and practical tests.

A small test was carried out after two or three teaching sessions or at the end of a short topic. A big test incorporated two or three topics or several sub-topics of an extended topic. For example, Loras explained that a big or long-term test was conducted by “combining ... questions [from] two or three topics and then we evaluate through these questions” (I2.T3:2). The short tests took about 30 minutes, while big tests took about 70 to 75 minutes.

Theoretical testing, also described as written testing, referred to tests conducted based on theoretical topics whereas practical tests related to activities where students drew or made objects. For example, Tom explained, “For the theory [part], it will be an individual written test. For drawing ... I may allow them to walk around to look at their friends’ drawings” (I3.T1:4).

Irrespective of whether schools required teachers to carry out tests or assessments, as specified in section 5.2.2, most teachers organised timed tests. Twenty-eight teachers (97%) mentioned that they conducted tests of these different types throughout the year irrespective of the class level and abilities of students.

Twenty-seven teachers (93%) claimed to perform regular tests during the year when implementing ‘assessment for learning’. In five schools, teachers conformed to the administration’s requirement to carry out a minimum of two to three tests per term. However, in six schools where assessment was only recommended, teachers still conducted tests. In one school, teachers were required to carry out one common test per term; however, the teachers conducted regular tests. The 27 teachers mentioned that they conducted three to four tests every term, or a test after each topic. For example, Reed from Rayfield, stated, “I do three written tests, and then ... one practical test” (I5.T3:2). The four types of tests D&T teachers conducted were considered as ‘assessment for learning’ because they used the gathered assessment

information to monitor students' learning progress, identify students' weaknesses, and develop short-term teaching plans.

The number of tests offered as 'assessment for learning' was dependent on the duration of teaching sessions. According to the D&T teachers, the longer the teaching sessions for a topic, the more tests were conducted. For example, Jon taught at Rayfield, where testing was not imposed. Rather, the number of tests was determined by several criteria, such as the number of teaching sessions, the number of students, and the class levels (e.g. upper six). Jon stated, "We may have small tests. ... it will be more than three, maybe four, five or even six" (I5.T1:2). Another teacher, Samuell, who was from Coldfield school, claimed that the school required two tests per term and examinations at the end of the second and third terms. Samuell added that the number of tests was dependent on the availability of a teaching session. For lower forms, a minimum of two tests was conducted every term because two teaching sessions (120 minutes) were available per week. However, for upper secondary classes, due to longer teaching sessions (360 minutes), Samuell may set four to five tests. In several cases, when enacting 'assessment for learning', teachers used tests as a substitute for classwork to verify students' learning.

Two teachers (7%) out of the 29 provided a different response and claimed not to use testing as one of their 'assessment for learning' practices. The two teachers were from different schools. Daario, who was from Rayfield, where testing was not imposed, emphasised that students were assessed mostly through assignments and project work. For example, Daario stated, "I rarely conduct tests" (I5.T2:1). Jorah, who was from Fairfield where testing was also not imposed, underlined that simple oral questioning, group work and hands-on activities were used to assess students. Jorah added that the oral questions used to check students' understanding were based on the learning intention of the lessons. Jorah was the only teacher who explained that he assessed his students without referring to the term test. For example, "As soon as we complete one topic, we have to assess students" (I6.T3:2).

The questions used for tests and assessments were extracted from various sources. The D&T teachers mentioned that test questions were from textbooks, self-designed,

or extracted from past examination papers (Cambridge International Examinations). The following section explains the use of past questions from the Cambridge International Examinations that were used during the D&T teachers' 'assessment for learning' practices.

### **5.1.2 Use of past examination questions**

Sixteen D&T teachers (55%) indicated that they used past questions from the Cambridge International Examinations when implementing 'assessment for learning' at the upper secondary level. According to these teachers, because Form 5 (16-year-olds) and Upper 6 (18-year-olds) students would participate in the Cambridge International Examinations at the end of the year, assessments given to these students were tailored to the past questions from the Cambridge International Examinations.

The D&T teachers provided several reasons for using past examination questions when enacting 'assessment for learning'. First, the teachers stated that they taught and assessed based on what students wanted, and added that students suggested that past questions from the Cambridge International Examinations be used. This indicates that the teachers' 'assessment for learning' practices were shaped by "what [the students] want[ed]" and "what they recommend[ed]", as mentioned by Catelyn (I4.T2:2). Second, the teachers believed that the more students were exposed to the Cambridge International Examinations questions, the better they would perform in the final examinations. Third, the teachers mentioned that the Cambridge International Examinations designed these questions to a specific standard, which were already trialled (tested). In addition, the teachers specified that their time and energy was not wasted preparing new activities. Fourth, the teachers claimed that they were accountable for students SC and HSC performances. For example, Stannis indicated, "The system here is exams-oriented, so students should get through at the end, and we have to do reports on [students' performance]. The MOE, what they do is, they assess the teachers based on [students'] results" (I12.T1:6).

The D&T teachers adopted two approaches when using past questions from the Cambridge International Examinations. The teachers claimed to lift and use the questions directly or introduce minor modifications. Teachers argued that similar types of questions were expected for the final examinations, so students were taught how to answer them. For example, Joffrey mentioned, “All our work is exams-oriented, so basically what we do is, we try to use ... exams [sic] questions and try to organise our assessment in line with examinations” (I7.T1:2).

The D&T teachers also acknowledged modifying past examination questions. For example, Reed clarified, “I use past exam questions, and I try to re-design the questions” (I5.T3:1) by making minor changes to questions. In some cases, drawing dimensions and company names were changed, while in other cases, the timing and marks allocated for questions were modified based on students’ level of achievement.

Teachers also mentioned that they started to use past questions from the Cambridge International Examinations two years before students sat the examinations. Bran explained, “At the start of Form 4, I prepare myself based on the tendency of the ... past exam papers” (I9.T2:3). When planning their assessment teachers also relied on some documents, such as, the syllabus, examiners’ reports and marking criteria, and ignored other documents, such as, the *National Curriculum Framework: Secondary* (NCFS).

### **5.1.3 Documents used as guidelines**

The D&T teachers used several documents to guide their ‘assessment for learning’ practices. Some of the documents were the syllabus, D&T textbooks and other Cambridge International Examinations documents, such as examiners’ reports and marking criteria. Another document D&T teachers referred to, but was disregarded by many, was the NCFS, introduced in 2009 by the MOE.

Teachers in only two schools talked about the NCFS without being prompted, while in the remaining schools, teachers were prompted several times. Out of the 29 D&T teachers interviewed, the teachers’ responses associated with the NCFS were

grouped into three categories: teachers who referred to the NCFS, those who ignored it and those who provided no indication of its use.

Nine teachers (31%) said that they referred to the NCFS to prepare their assessments. However, only three of them claimed that they referred to the ‘overarching learning outcomes’ of the document which were related to the specific goals of the National Curriculum. The three teachers (10%) used the NCFS to ensure that they were teaching and assessing according to the goals specified in the policy document. Sandor clarified that “based on the objectives that were set in the NCFS, we use these to prepare our classes” (I7.T3:2).

The other six teachers (21%) who mentioned referring to the NCFS to prepare assessments provided vague responses, disagreed with the NCFS objectives or were hesitant in their responses. Two teachers commented that they irregularly referred to the document, without any further explanations. One teacher, Grey, disagreed with the NCFS objectives. He explained, “I find that some of the objectives are a waste of time, and I use them partially” (I6.T1:2). Grey added that the NCFS does not cater for all schools, was of no use for schools with high ability students, and was only partially appropriate for schools with low achievers.

The other three teachers (10%) were hesitant in their responses about using the NCFS for their assessments. Davos expressed, “We used [the NCFS]. Maybe unintentionally we are using it. Without knowing, we are abiding by what is said in the NCFS. Everything that we do is according to the NCFS” (I9.T1:3).

Two teachers simply claimed to use the NCFS, but were not able to explain how they used it and seemed unaware of its purpose and content. These two teachers did not possess an initial teacher education qualification. When asked whether they used the NCFS, Samuell responded, “Yes partly, because it does not deal directly with D&T” (I11.T1:2).

Thirteen teachers (45%) indicated that they ignored the NCFS. Nine teachers (31%) simply said that they disregarded the NCFS and provided no additional comments. Three teachers (10%) explained that they considered that the NCFS was

inappropriate. For example, Rickon said, “When we read the document, we see it is not relevant” (I8.T2:3).

Of the 13 teachers, Tyrion, who had 26 years of experience teaching D&T at the secondary level and possessed a Postgraduate Certificate in Education in D&T, had never heard of the NCFS. This was a surprising finding, given that the academics from the Mauritius Institute of Education who taught him and the MOE would expect Tyrion to be mindful of the NCFS, its goals and assessment methods (including ‘assessment for learning’) recommended for D&T. However, the interview with him revealed the opposite:

Tyrion: “Do we have a National Curriculum for D&T?”

Interviewer: “Yes, the National Curriculum is for all the subjects.”

Tyrion: “I hope the books also are planned based on the National Curriculum. The National guideline is from which year?”

Interviewer: “2009” (I12.T2:3).

The fact that Tyrion was not aware of the NCFS provided some indications of teachers’ involvement with the policy document. First, it suggests that the NCFS goals and assessment methods were not discussed at the D&T department level (or school level). Second, there was clearly a communication gap between the MOE and teachers (and schools) concerning the NCFS, which includes assessments. If teachers were expected to conduct assessment according to the NCFS, then workshops/training should have been organised by the MOE to explain the purpose of the policy document to teachers and principals. From the questionnaire responses obtained before the teacher interviews, teachers mentioned that they were not provided with any professional learning and development regarding the NCFS (including assessment practices).

The other seven teachers (24%) did not indicate whether they used the NCFS or not to guide their assessment practices. Six teachers did not respond to the questions about using the NCFS when implementing ‘assessment for learning’. However, one teacher, Jaime, tried to show his understanding about the NCFS and claimed that the syllabus and textbooks were reviewed and changes were brought in line with



the NCFS. Jaime said, “I think it is wise to have it because we need to reflect on what we are doing at school and we need to re-visit it from time to time” (I10.T1:3). No indication was obtained on how the NCFS guided Jaime’s assessment practices.

For all the teachers, the syllabus was the main and most frequently used document as guidelines for preparing for their assessment practices. The teachers emphasised use of the upper secondary syllabus more than the lower secondary syllabus. When questioned about the ‘assessment for learning’ guidelines they used, D&T teachers’ first response was ‘the syllabus’. For example, Mark claimed, “No, we do not have prescribed guidelines, except the [Cambridge International Examinations] syllabus” (I2.T2:3). The main reason for the teachers focusing on the syllabus was because their students would participate in the SC and HSC examinations, and it was important to complete all the topics in the available time and assess the students in these content areas. For example, Bronn pointed out, “Our exams are oriented to University of Cambridge Examination [sic], so we need to go according to this [syllabus]” (I8.T1:3).

The D&T teachers also followed the lower secondary syllabus when preparing students for examinations. However, greater emphasis was laid on the lower secondary syllabus in three state secondary schools where two examinations were carried out in one academic year, and teachers (17%) from two of those schools highlighted that they had to follow the syllabus to the letter. Specific topics had to be completed by the end of second and third terms, and the students had to be regularly assessed on several topics. For example, Bronn explained, “By the second term, we have to complete these topics ... so that students [are not] penalised for the exams” (I8.T1:4). The examination results of these two schools were compared with three other schools. So when these teachers enacted their ‘assessment for learning’ practices, they tended to prepare their students to obtain the highest possible marks for the internal common (across schools) examinations. In all the state secondary schools, irrespective of the classroom level, it seems that the D&T teachers ‘assessment for learning’ practices were primarily guided by the syllabus, with the aim of preparing students for examinations.

Ten D&T teachers (34%) mentioned that they used the examiners' reports from the Cambridge International Examinations to plan their 'assessment for learning' practices at the upper secondary level (students aged 15+). The teachers clarified that the SC and HSC examinations examiners' reports were relevant as these provided general indications about students' weaknesses and strengths for each examination question. The D&T teachers indicated that during their 'assessment for learning' practices they regularly enlightened their students about the mistakes of other students who already sat for Cambridge International Examinations. For example, Davos claimed, "At the start of Form 4, I prepare [my 'assessment for learning' plan] based on the tendency of past exams ... reports" (I9.T1:3). The teachers seemed to believe that their students were better prepared for the final examinations when the examiners' reports were used to provide feedback and guidance on other students' responses when 'assessment for learning' was enacted.

The D&T teachers also mentioned using the marking criteria from the Cambridge International Examinations when enacting 'assessment for learning', especially at the upper secondary levels. The obvious reason that D&T teachers replicated the allocated marks (Cambridge International Examinations marking criteria) was so that the school, teachers, students and parents would be aware of the levels at which students were performing. For example, Sansa explained that she would "know the levels of the students ... depending on the marks [that] they are going to obtain" (I3.T2:1).

Three teachers (10%) also used these marking criteria at the lower secondary levels. These D&T teachers commented that when a topic was taught at lower secondary, which was also part of the upper secondary syllabus, then a breakdown of the marking criteria was useful to assess lower secondary students on 'assessment for learning' tasks. For example, Benjen described, "Some of the criteria are used for SC; we can use them to assess some drawings and designs" (I13.T2:2). Other teachers highlighted that the marking criteria used to assess design projects at SC were employed for their 'assessment for learning' practices to assess project work at lower secondary levels.

All 29 teachers used the prescribed textbooks recommended by the school for their ‘assessment for learning’ practices at the lower secondary levels. When the teachers completed their explanations, the activities provided to students were mostly taken from the manuals, and all students were given the same tasks. Jaime clarified, “For the planning of assessment we always go to the textbook, as the notes given to students during the lessons are from the textbook” (I10.T1:1). The main reason being that the ‘assessment for learning’ activities were organised according to specific content. Moreover, the content of the textbook reflected the syllabus. Stannis explained, “I just followed the textbooks that have been prescribed ... You have the syllabus there, and I just try to complete [the activities]” (I12.T1:2). In fact, when the teachers used textbook activities as assessment tasks, they demonstrated that they were covering the syllabus.

The findings under this theme revealed that the D&T teachers’ assessment practices were used as a platform to prepare students for the various internal and external (high-stakes) examinations. Hence the ‘assessment for learning’ practices of the D&T teachers involved regular tests, use of past external examination questions, examiners’ reports and marking criteria, and coverage of the syllabus to the letter via the textbook, while the NCFS was neglected.

## **5.2 Completing Administrative Duties**

Findings under this theme helped distinguish how the D&T teachers’ ‘assessment for learning’ practices were influenced by their administrative duties. These results contributed to an understanding of how the teachers’ beliefs concerning administrative duties shaped their rationale for implementing ‘assessment for learning’.

The interviews revealed that the 29 D&T teachers conflated their ‘assessment for learning’ practices with their administrative duties. According to the teachers, in one way or the other, the school administration or the MOE provided them with instructions (including ‘assessment for learning’ guidelines) for completing their administrative responsibilities, which they had to follow. The opinions of the teachers when merging their ‘assessment for learning’ practices with administrative

duties (which seemed to influence their ‘assessment for learning’ practices) are discussed under the following sub-headings: daily assessment, formal assessment, documenting information and providing evidence.

### **5.2.1 Daily assessment**

Some teachers considered the daily assessment of students as part of their job. Daily assessment was the term that most teachers used to refer to ‘assessment for learning’ practices. Even if all the teachers conducted ‘assessment for learning’, 10 teachers (34%) emphasised that they assessed in the course of their teaching duty. These teachers mentioned that directives were given to them and they had to conform. Jaime stressed that administrative requirements were given priority. He added that daily assessment was conducted “for administrative purposes” (I10.T1:1) where teachers had to keep a record of students’ progress.

The merging of ‘assessment for learning’ practices with administrative requirements by the teachers led them to allocate marks frequently. Some teachers gave marks because they believed that this practice forced students to work harder. Ten teachers reported that they verified students’ classwork and allocated marks daily. For example, Daario underlined, “I correct the exercises ... [and] always give marks” (I5.T2:4). Students’ copybooks and homework were also marked and the results recorded. In some cases, the accumulated daily marks were used as a percentage of term marks. The teachers articulated that even when the marks were not compiled at the end of the term, they allocated marks to show that students’ learning was continually monitored. For example, Catelyn explained, “I use the technique of marking. [Even] if it is not counted for assessment, but I give marks. ... on five marks, 10 marks, I give them marks” (I4.T2:5).

### **5.2.2 Formal assessment**

Another reason for the D&T teachers conflating their ‘assessment for learning’ practices with administrative duties was due to the school compelling them to conduct formal assessments. In some schools, these formal assessments took the form of ‘assessment of learning’. The D&T teachers explained that at the end of each term, they were required to insert marks in students’ report books that were

ultimately handed over to their parents. Hence, the school administration provided detailed guidelines to teachers to conduct specific numbers of formal assessments for each term. However, there were variations in the directives given to teachers of the 11 state secondary schools. Seventeen teachers (59%, from six schools) claimed that their principals asked for three marked assessments per term. Three teachers (10%, one school) revealed that the administration demanded two or three marked assessments per term, seven teachers (24%, from three schools) indicated a minimum of three, and two teachers (7%, one school) revealed a minimum of two marked assessments were required.

In four schools, the D&T teachers (10 teachers, 34%) mentioned that the timing of the formal assessments was communicated by their respective principals. These teachers stated that along with the number of formal assessment, it was indicated in advance when these assessments had to be performed. In three schools, teachers shared that the guidelines provided by their school specified that the first assessment had to be completed before the 29<sup>th</sup> of January, the second assessment before the 28<sup>th</sup> of February and the third assessment before the 29<sup>th</sup> of March. In the fourth school, guidelines for deadlines of assessment were provided in terms of weeks. For example, Gregor stated, “The timing when to do [assessment], by what week of the term, [and when] the first assessment should be completed” (I4.T1:2). The findings revealed that the schools’ assessment guidelines strongly influenced D&T teachers’ ‘assessment for learning’ practices.

The teachers provided different explanations on the types of formal assessments they had to administer. Fourteen teachers (48%) from five schools were directed to use tests for the formal assessments. Thirteen teachers (45%) from five other schools declared that the formal assessments could take any form, although two teachers from one school explained that the directives were to include one common test. For example, Davos shared that “the zone (administrator) also imposes this” (I9.T1:2). From the teachers’ explanations, it can be deduced that the directions given by the administrations of the schools were not uniform and influenced by the principals’ (and administrators’) beliefs (decisions/actions). Regardless of reason, these directives appeared to frame the teachers’ ‘assessment for learning’ practices.

In Greenfield school, the two teachers disagreed about the mode of formal assessment. Bran thought that the school asked for three (written) tests, while Davos thought, “the policy is three assessments, not three written tests” (I9.T1:3). This discussion revealed that the teachers differed in their interpretation of the terms ‘assessment’ and ‘test.’ This conversation with the teachers indicated that some teachers considered assessment synonymous with test, while others could differentiate. This confusion could also exist at the school administrative level. An unclear understanding of the terms test and assessment, coming from the school administration, would certainly affect the D&T teachers’ formal assessment as well as ‘assessment for learning’ practices.

### **5.2.3 Documenting information**

Another reason for the teachers merging their ‘assessment for learning’ practices with administrative duties was due to the requirement of documenting students’ marks. The marks that teachers documented in their registers, which were later transferred to the students’ report books, were mainly obtained from the D&T teachers’ ‘assessment for learning’ practices.

The personal document in which teachers initially recorded the marks was referred to as a markbook. The teachers claimed that it was mandatory to maintain a register of students’ marks. Teachers’ markbooks had to show the percentage score of each assessment as well as the topic and date on which it was conducted. In most cases, teachers felt that the purpose of their ‘assessment for learning’ practices were mainly to collect students’ marks for the markbook. For example, Sandor said, “We carry out those assessments just to obtain marks” (I7.T3:9).

At the end of each term, all teachers were required to transfer the marks from their markbooks to the students’ report books that were handed over to the parents. Joffrey claimed one of the purposes of assessment was “to finally have a mark to put into the report book at the end of the term” (I7.T1:9). The teachers also said that they were required to add general comments on the performance of their students. Rickon expressed his frustration and questioned the act of reporting to parents. Rickon claimed that reporting was done “maybe ... to give the impression to parents

that we are working at the school” (I8.T2:2). In addition to reporting to parents, the D&T teachers were required to provide evidence of the assessment task from which marks were obtained.

#### **5.2.4 Evidence for administration**

Another reason for teachers conflating their ‘assessment for learning’ practices with administrative duties was the need to produce (on administrative demands) several documents that the teachers used for their ‘assessment for learning’ practices. Some of the evidence that teachers were required to show the school administration and inspectors included the yearly plan (scheme of work), weekly plan, daily lesson plan and samples of assessment (including ‘assessment for learning’ tasks). Tom commented, “The administration [asks for] these documents” (I3.T1:3).

Five teachers (17%, from two schools) mentioned that in their schools, a team of D&T teachers identified by the school’s board prepared the yearly plan. A common scheme of work was used because at the end of the second and third terms, common examinations were carried out in these two schools. The schools provided the teachers with a booklet to plan their weekly teaching and their assessment activities, which were inspected by administration at the end of each term.

The other 24 teachers (83%) prepared a yearly plan in their respective D&T departments. These teachers, however, were required to submit a copy of their term plan to their school administrations at the beginning of each term. Only three of these teachers (10%, from one school) claimed that they were provided with a booklet to record their weekly teaching and the ‘assessment for learning’ activities to be verified by the administration. Most of the teachers explained that they were required to prepare their daily lesson plans, indicating the ‘assessment for learning’ activities used for each lesson. According to the teachers, the daily lesson plans were verified when inspectors from the MOE visited their classes. The teachers claimed that inspectors specifically checked if ‘assessment for learning’ activities were given to students and were corrected.

All the teachers reported that at the end of each term, they were required to submit examples of two or three assessment activities to the administration of their respective schools. The majority of the teachers mentioned setting the minimum number of formal assessments because of time constraints. Sandor explained, “the three assessments are mostly in the form of class tests because each term we have to give a sample of our class tests to the administration of the school” (I7.T3:9). Even in schools where teachers had the freedom to not use tests, teachers preferred this method of assessment because they had to provide evidence of assessment to the school administration. Davos clarified, “I do assessment, not three tests. I give only two written tests” (I9.T1:3). The interview findings revealed that the teachers’ ‘assessment for learning’ practices were converted to ‘assessment of learning’ practices due to the administrative directives. However, many teachers considered these tests as ‘assessment for learning’ tasks.

The findings under this theme revealed that the teachers conflated their ‘assessment for learning’ practices with administrative duties, which was due to the assessment guidelines of the schools. Hence, when the teachers implemented ‘assessment for learning’, they frequently conducted tests and allocated marks that were needed for administrative purposes. Further conflation occurred because the school administrations required teachers to provide evidence of teaching and assessment plans, as well as samples of assessment activities.

The findings in section 5.2 have shown that although the main purpose of ‘assessment for learning’ was to monitor students’ learning, this purpose was compromised by administrative requirements. The next section elaborates on teachers’ perspective and application of ‘assessment for learning’ to refine their teaching.

### **5.3 Refining Teachers’ Practices**

Several D&T teachers considered that they used ‘assessment for learning’ to refine their short- and long-term lesson plans. Teachers emphasised four key areas: checking the effectiveness of their teaching, improving their teaching decisions, transforming their practice, and planning future lessons.



### **5.3.1 Checking teaching effectiveness**

The D&T teachers said that they used their assessment practices to understand their teaching effectiveness. Nineteen teachers (66%) expressed that the assessment outcomes provided indications about several aspects of their teaching, such as, if they had properly explained the lesson(s), whether explanations were clear to students, or what content they were able to deliver to their students during a particular term. The teachers added that, based on the assessment outcomes, they decided on the necessary steps to be taken next, such as, if they had to re-explain a lesson, provide reinforcement activities, or change the way they taught. According to Davos, assessment was about diagnosing teaching: “To know whether the way I am teaching is correct” (I9.T1:3). To refine their teaching, teachers made two main decisions: improving teaching decisions and transforming their practice.

### **5.3.2 Improving teaching decisions**

The decisions that the D&T teachers made to improve their teaching depended on the assessment information they collected, which was mainly related to students’ learning weaknesses. This section explains the type of decisions teachers took to cater for students’ difficulties. Three areas were identified by the teachers, which included refining or redirecting teaching to address misconceptions, shaping subsequent lessons, and addressing the learning objectives.

To help students’ in their learning, teachers refined or redirected their teaching to address students’ misconceptions. Thirteen teachers (45%) reported that they used diverse approaches to refine or re-explain their teaching when students had difficulties in executing the activities or were unable to respond to questions during ‘assessment for learning’. Six teachers (21%) said that they changed their teaching strategies for students who had difficulties understanding a particular lesson. Three teachers (10%) claimed that they re-explained the lesson(s). One teacher mentioned that he provided students with remedial activities, and three teachers indicated explaining in simpler ways or more slowly to help students understand what they were trying to teach them. Less than half of the teachers interviewed commented

on refining or redirecting their teaching to address students' confusions that were identified during their 'assessment for learning' practices.

Nearly one-third of the teachers indicated shaping subsequent lessons to help students learn better. Ten teachers (34%) described that they used 'assessment for learning' information to prepare the next teaching session(s). This percentage shows how many teachers believed adjusting their lesson would lead to better learning. However, out of the 10 teachers, only four (14%) specified that they used assessment information to take remedial action within a future scheduled lesson to help students who had difficulties. One teacher emphasised that he used 'assessment for learning' information to re-explain lessons. However, this particular teacher was not referring to an assessment conducted during lessons, but assessment organised at the end of a topic. Two teachers (7%) elaborated that if students were not able to understand, then they would plan to explain the lesson in a simpler way in the next class. For the other three teachers (10%), 'assessment for learning' information allowed them to decide if they could proceed with subsequent lessons.

Warwick et al. (2015) consider clarifying and sharing learning intentions are a key strategy of 'assessment for learning' to gain insights into students' learning. However, the findings in this study suggest that only two teachers (7%) considered addressing the learning intentions to help students learn. One teacher commented that when the students had difficulties, the learning intentions were simplified to help them learn. The other teacher stated that the teaching strategies were modified to ensure the students attained the learning intentions. For example, Jorah claimed, "I will ... alter my teaching strategies so that they can achieve the learning outcomes properly" (I6.T3:5). The teachers also expressed that 'assessment for learning' information was used to transform their practice, which is discussed in the next section.

### **5.3.3 Transforming teaching practice**

To successfully help students' in their learning, teachers need to critically analyse their practice (Shepard, 2000). The teacher interviews revealed that D&T teachers

used ‘assessment for learning’ information to transform three aspects of their practice: adjust lessons, plan curricula and justify teaching decisions.

A good way to transform teachers’ practices is to use students’ ‘assessment for learning’ information to adjust lessons and teaching plans (Shepard, 2000). However, only one teacher, who had 11 years of teaching experience, specifically mentioned that ‘assessment for learning’ information was used to modify lessons. This teacher explained that, if he realised that students were having difficulties with a particular topic or sub-topic, then he needed to spend more time on that particular topic or sub-topic. To be able to bring about the desired changes, the teacher specified that the required information needed to be recorded and adjustments made to the lessons at a later stage. Ramsey claimed, “[Assessment] will ... help us ... change our way of conducting [our] classes; for example, we might put more emphasis on some sections” (I7.T2:7). Ramsey’s explanation indicated that he was conscious that such adjustments would influence long-term planning of teaching and assessment.

‘Assessment for learning’ information was also used to plan the school curriculum. For example, teachers discussed how the effectiveness of activities from textbooks could be evaluated. The teachers elaborated that at times, mistakes were present in these activities. However, only four teachers (14%) mentioned using assessment information to modify and plan their curricula. These teachers believed that assessment information provided them with enough details that allowed them to improve their yearly plan (scheme of work) and lesson plans. For Jaime, assessment information was “mainly used to re-plan the same lesson for the next batch” (I10.T1:5). For Ramsey, this information helped planning the scheme of work. However, the D&T teachers did not use ‘assessment for learning’ information to examine and plan activities that aligned with students’ interests.

The ‘assessment for learning’ information collected by teachers can also be used to research and justify teaching decisions (Shepard, 2000). Only one teacher emphasised that assessment information allowed him to reflect on his teaching decisions. This teacher highlighted that he reflected on what and how things could

be done to improve his teaching. The teacher added that he reflected on the changes he brought to his teaching based on feedback he received from students.

#### **5.3.4 Planning future lessons**

The key to good teaching and assessment lies in the effective preparation of teachers' plans (Butt, 2008; Marshall, 2010). The D&T teachers mentioned that they used 'assessment for learning' information to prepare their year and/or term and weekly teaching plans as well as daily lesson plans. All the teachers claimed to possess an annual teaching plan for each class level. Twenty-three teachers (79%) said that they prepared their weekly and daily teaching (lesson plans) based on the year and/or term plans. The remaining six teachers were not using weekly and daily lesson plans.

These six teachers were from three different schools. Two teachers had less than eight years teaching experience, two had between eight and 18 years, and the remaining two had over 18 years. Two of the six teachers asserted they were doing daily lesson plans previously and they stopped; the teachers claimed to have the required experience allowing them to know what they have to do. The six teachers seemed to believe that lesson planning did not help improve teaching and learning. Two teachers claimed that they did the planning mentally with minor planning on paper. For example, Jorah explained, "Most of the planning is done mentally ... some planning is done on paper ... like [I] jot down some questions" (I6.T3:3). Khal, who had six years of teaching experience, added that 'assessment for learning' was not planned at lower secondary levels, but he used the syllabus (textbook contents) and set activities from textbooks. The next section elaborates on how D&T teachers used 'assessment for learning' characteristics to cater for students' learning.

The findings under this theme revealed that the D&T teachers used their 'assessment for learning' to improve their practice. The teachers reported that the assessment information they gathered indicated the next steps they needed to take to improve both teaching and learning. Hence, according to the teachers, 'assessment for learning' improved their teaching decisions and helped them plan

future lessons. However, a limited number of teachers were using ‘assessment for learning’ information to reflect more deeply about their practice and transform it.

## **5.4 Enhancing Students’ Learning**

The main purpose of ‘assessment for learning’ is considered to improve students’ learning (Black & Wiliam, 2004). The findings under this theme were helpful to understand the D&T teachers’ views on the contribution of ‘assessment for learning’ for enhancing students’ learning. This section describes four key areas on which teachers focused when implementing ‘assessment for learning’ for better students’ learning: learning intentions and success criteria, classroom discussion and learning tasks, the medium of feedback to students, and self-assessment, peer learning and group work.

### **5.4.1 Learning intentions and success criteria**

S. Chappuis and Stiggins (2002) state that learning intentions should not only be provided at the beginning of the lessons, but teachers should continuously clarify learning intentions as lessons unfold. However, the findings from teacher interviews revealed that the D&T teachers provided the learning intentions differently.

Twenty teachers (69%) said that they communicated the learning intentions at the beginning of each teaching session. Of the 20 teachers, four teachers (14%) stated that learning intentions were also referred to during lessons, and out of the four, one claimed that he used learning intentions to guide students through the assessments process. For example, Stannis stated, “I forecast and give them hints of what will be assessed” (I12.T1:4).

Four teachers (14%) said they communicated the learning intentions when students’ activities were marked and corrected. One teacher added that the learning intentions were mentioned when marks were allocated, and feedback provided to students. For example, Khal explained, “I usually tell them after having corrected their scripts. I ... talk to the students ... after the correction” (I6.T2:3).

The remaining five teachers (17%) did not mention clarifying and sharing the learning intentions of each teaching session or when giving or verifying tasks. Two teachers (7%) revealed that they informed students of the learning intentions at the beginning of each term, while another two teachers said they communicated the learning intentions at the start of each topic. One teacher stated that the learning intentions were communicated both at the beginning of the term and before starting a topic. Out of these five teachers, only Loras did not possess a teacher education qualification, which might explain his lack of understanding regarding sharing and clarifying of learning intentions.

One teacher, Joffrey, who was the head of the department at Sheffield school, disagreed with one of his colleagues about the timing of communicating the learning intentions. Joffrey claimed, “[It] is [an] established fact that learning intentions have to be shared before starting a lesson” (I7.T1:4). He added that the learning intentions should be “written somewhere on the board” for students, serving as a motivation and reminding them what they should achieve by the end of the lesson. Joffrey stressed that students should be able to “do something new ... at the end of [each] lesson” (I7.T1:4).

The findings showed that few teachers explained the success criteria for learning tasks. Only one teacher claimed to provide success criteria to students. However, the teacher provided the criteria, in the form of written comments, only to students who had difficulty completing the learning activities. Tyrion commented, “If [the activity] is wrong, then there are the criteria” (I12.T2:5–6).

It seemed that the D&T teachers did not provide the success criteria to support students in their learning, but to help them complete assessment tasks, which were used for marking purposes. For nine teachers (31%) the criteria for success were in the form of marks. If most students obtained satisfactory marks, then teachers interpreted that to mean that teaching and learning were successful. However, even after marks were assigned, the teachers stated that they explained and discussed the tasks with their students to ensure that they identified their mistakes in line with the criteria.

### 5.4.2 Classroom discussion and learning tasks

Classroom discussion and learning tasks were other ‘assessment for learning’ characteristics that the D&T teachers claimed to adopt to enhance students’ learning. The teachers mentioned using three methods: monitoring students’ progress, identifying their weaknesses and strengths during lessons, and using various assessment methods.

All 29 D&T teachers indicated that they monitored their students’ progress as they enacted ‘assessment for learning’. Eighteen teachers (62%) seemed to focus on students’ level of understanding. For example, Grey expressed, “We need to know where students are in the learning process” (I6.T1:1). Eleven teachers (38%) stressed student ‘assimilation’. These teachers were more focused on the content they delivered. For example, Tyrion wanted to know, “How far students have been able to ‘absorb’ what I have delivered” (I12.T2:1).

When monitoring students’ learning, little importance was placed on their prior experiences. Only two teachers (7%) verified their students’ prior knowledge and experiences, and built on these to organise their classroom explanations and assessments but did not link them with ‘assessment for learning’ activities.

The D&T teachers identified their students’ strengths and weaknesses as they monitored their activities. All teachers claimed to determine their students’ weaknesses. The teachers carried out remedial classes or re-explained the lessons with the aim of correcting their students’ mistakes. Only three teachers (10%) mentioned focusing on students’ strengths to reinforce their learning. For example, Loras shared, “Know the weaknesses and strengths of the students” (I2.T3:1). Overall, no teacher referred to the learning intentions of the lessons when referring to monitoring students’ progress or identifying the weaknesses and strengths of students when enacting ‘assessment for learning’.

The teachers claimed to use a variety of approaches to assess students’ learning. The approaches reported were sketching and drawing, oral questioning, practical work, discussion and brainstorming, group work, project work, research work,

presentation, and testing. All teachers stated using oral questioning, sketching and drawing. However, only four teachers (14%) commented that they used presentation methods to assess their students, which were mainly organised at Form 6 levels (17- and 18-year-olds). Ten teachers (34%) claimed to use group work.

Most teachers claimed to organise practical activities for upper secondary classes (aged 15+). However, the practicals depended on the availability of specialist room facilities in the D&T department. Practical activities for lower secondary classes were organised if classes were not crowded or when classes were split between two teachers. At lower secondary (students aged 12 to 14) levels, easy, practical activities associated with paper products were encouraged. Bronn claimed, “I can ask students to [take part in] group work and do (paper) models” (I8.T1:6). Similarly, many teachers merely displayed tools to students at the lower secondary level. Students were then required to sketch the tools, consulting the prescribed textbooks. Afterwards the teachers asked the students several oral questions to explain the functions of specific tools. For example, Catelyn stated, “We can take them to the workshop, and they will not do the practical, but at least they will identify the tools” (I4.T2:3).

Many teachers mentioned that the modes of assessment were dependent on the topics they taught. For drawing and sketching activities, teachers explained and assessed their students based on the application of the required skills. While for theoretical topics, some students were asked oral questions to check their learning. For example, Rickon claimed, “For theory, it is usually oral; nothing is written because we do not have time for this” (I8.T2:6). However, other teachers mentioned that they provided written activities from textbooks for students to practise (for which marks might be given), and a test might follow at the end of the topic.

After sharing the learning intentions and going through classroom discussion and learning tasks, D&T teachers provided feedback to their students. Feedback was provided for various reasons and in several ways as described in the next section.



### **5.4.3 Medium of feedback**

There are different methods of providing feedback to students to improve their learning. The D&T teachers provided feedback to students in various ways, namely in writing and/or orally, and individually and/or generally to the whole class. Teachers also preferred to give feedback to selected groups of students. The section also discusses whether descriptive feedback or the correct answer were provided to the students.

#### ***Verbal and written feedback***

Several D&T teachers expressed that they provided either written and/or oral feedback to their students during their assessment practices. Eleven teachers (38%) offered only verbal feedback, six (21%) gave only written feedback, and 12 teachers (41%) gave both oral and written feedback.

Twenty-three (79%) teachers claimed to provide verbal feedback to their students where they first showed the students their mistakes and then explained to them how to correctly complete each activity. One teacher added that the students were informed where they lost marks. For example, Arya revealed, “We will discuss where they have lost marks corresponding to the activities” (I2.T1:8). It seemed that the main reason for providing verbal feedback was to identify and correct students’ mistakes in set activities rather than encouraging them to reflect on and solve their problems.

Eighteen teachers (62%) claimed to provide written feedback to their students. Eleven teachers (38%) mentioned providing the written feedback to support their students in answering the questions. The teacher feedback was in the following forms: answers to the questions, explanations to complete the task, an indication about sections that required improvement or a freehand drawing done on the students’ copybook during the personal explanation. Davos said, “Putting a remark ... which part is not correct and I need to tell [the student] how he should have done it” (I9.T1:6). Four teachers (14%) provided written feedback in the form of comments that verified their activities. The four teachers articulated that these remarks also served to motivate the students. Jaime stated that the feedback was

“written, for appreciation of the students’ work done in their copybooks [and] journals” (I10.T1:5). Three teachers (10%) who gave marks when verifying students’ activities, considered the marks as a form of feedback.

Amongst the 23 teachers, five (17%) provided judgemental feedback only that was positive. They praised the students for their work and focused on the students’ strengths with the aim of motivating the students to work harder.

### ***Individual, general and group feedback***

The teachers specified three types of written and verbal feedback. These were individualised, general to the whole class and group feedback. Only three teachers (10%) mentioned providing both individual and general feedback, and only one teacher revealed offering both individual and group feedback.

The majority of teachers provided individual feedback to their students. Twenty-six teachers (90%) highlighted that individual feedback was preferred as they considered this type of feedback to be more meaningful for students’ learning. The teachers articulated that the personal feedback would not offend the learner in front of their peers. One teacher added that individual feedback was more useful in that particular school context because the students never sketched or drew with the same pace and style, so the explanation and timing varied from one student to another. One teacher explained that individual feedback was relevant for the students showing their projects for the Cambridge International Examinations. The teacher added that first, the project was personal, and second, the students were required to present their project works for monitoring purposes. In that case, specific and prompt individual feedback was given to each student.

Few teachers (five teachers, 17%) provided general feedback to enhance learning. Two teachers (7%) pinpointed that the general feedback was provided during their teaching when oral questions were set to the whole class. The teachers emphasised that the general feedback was verbal; the advantage being that prompt feedback was given to all students. Joffrey stated, “We can correct things straight away” (I7.T1:7).

The other three teachers (10%) used general feedback to warn the whole class of basic mistakes by some students. Two teachers (7%) indicated that they would not pinpoint the student(s) who made errors, but some common mistakes were revealed to all students. For example, Stannis shared, “If someone made a huge mistake, I would expose it to the whole class” (I12.T1.5). The idea was to prevent other students from repeating the same mistake(s). Again, it seems that the purpose of the activities set were not provided to allow the students to explain or reflect on their mistakes because ultimately the teachers provided the answers.

One teacher indicated that after marking students’ scripts individually, they worked out the activities set on the whiteboard to indicate any errors. For example, the teacher explained that he demonstrated the steps that the students had to adopt to complete the drawing activities.

Most of the D&T teachers gave more importance to individual and general feedback rather than group feedback. Only one teacher revealed identifying if several students faced the same problems when attempting the assessment activities. The teacher then arranged for group instead of individual verbal feedback.

For most D&T teachers, feedback meant that they provided the correct answers to the activities and not descriptive feedback. Overall, 27 teachers (93%) disclosed that they provided the answer or worked the solution for their students. For example, Reed stated, “I identify the different mistakes that they have done, and then I try to explain to them” (I5.T3:4).

However, from the group of the 27 teachers, only two teachers (7%) claimed to offer feedback so that their students would understand the learning intentions and to build a positive relationship with them. Joffrey articulated, “Feedback creates a bond between the teacher and the student through the conversations [which] helps [the] student to feel at ease” (I7.T1:8).

#### **5.4.4 Self-assessment, peer learning and group work**

Only one teacher claimed to use self-assessment in their classroom. The teacher explained that if students had partially understood the content, and were willing to use self-assessment, he would support the students. The teacher added that it would be the students' responsibilities to learn and improve. For example, Eddard said, "If someone ... wants to assess himself, then he would do research work to find out what should be done" (I8.T3:9).

Ten teachers (38%) reported using of peer learning for specific tasks, which involved drawing, research, modelling and presentation. The teachers emphasised that they did the assessment by questioning to see if students had understood the lesson and/or by allocating marks. For example, Joffrey stated that it is "the teacher [who] is going to assess the content of the research work" (I7.T1:2). It seems that teachers used peer learning to allocate marks to students, and not to help them learn.

It appears that when peer learning was implemented, its purpose was to facilitate teaching. One teacher, Mark, used peer learning in classes comprising of many students. Mark specified that he was aware of the difficulty of giving individual attention to all students since there was a high number of low-performing students. According to Mark, with peer learning, the students would benefit from their peers through questioning and discussion.

However, another teacher disagreed with the number of students allocated for D&T and argued that classes should be split to encourage teachers to perform group work and group assessment. For Tyrion, "The workshop was [done to accommodate] 20 students" (I12.T2:6). Theon, who is from another school, claimed that they have up to 40 students in their class. Theon contended, "How are we going to manage?" (I13.T1:7). According to these teachers, they could not organise group work and group assessment because of the large number of students.

The findings under this theme revealed that the teachers did not emphasise learner autonomy in order to enhance learning. For example, few teachers implemented

self-assessment, one-third of the teachers used peer learning for selected topics, and group work was used to facilitate teaching rather than improve learning.

## **Summary**

This chapter presented the findings from the teacher interviews conducted in 11 state secondary schools. The results demonstrated that D&T teachers emphasised preparing students for examinations and considered assessment as an administrative duty. The findings also suggested that the D&T teachers were more focused on adjusting their teaching in response to immediate learning requirements than transforming (and reflecting on) their practice for long-term learning needs, which is deemed critical for teaching effectiveness. Lastly, the findings indicated that the D&T teachers were not effectively implementing ‘assessment for learning’. The D&T teachers seemed to focus more on providing answers to questions and problems set when enacting their ‘assessment for learning’ practices, and allocating marks on the activities provided rather than emphasising improving students’ learning.

Chapter Six will elaborate on the findings from observing teachers’ practices in the classroom, conducted in three different schools, with the aim of gaining first-hand information on D&T teachers ‘assessment for learning’ practices.

## CHAPTER SIX

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### TEACHERS' PRACTICES IN THE CLASSROOM

This chapter reports the research findings generated through multiple data sources obtained from three Design and Technology (D&T) teachers' practices in three different state secondary schools in Mauritius. The purpose of this investigation was to gain an awareness of the D&T teachers' 'assessment for learning' practices.

This study adopted an ethnographic methodology, where a participant observation approach was used to collect multiple data sources. The primary data comprised of structured observations that were guided by a rubric table (Wylie & Lyon, 2013) identifying the dimensions of 'assessment for learning' (see Appendix H) and were recorded on a grid (see Appendix G). The observed classes were audio-recorded, and the observation data were supplemented with field notes, teachers' informal interviews and photographs of teaching plans, students' progress records, teachers' assessment guidelines on the whiteboard and students' activities. Whenever quotations from participants during the observations and informal interviews and secondary data are presented in this chapter, an audit trail was used. Accordingly, a code number was assigned (see Tables 11.2 to 11.5 of Appendix S for further details) for tracking purposes. For example, SD.T2.L5.P6 refers to Secondary Data taken from Teacher 2 during Lesson 5 and was the Photo number 6. Pseudonyms were used to avoid the identification of the participants as in previous chapters.

The three schools selected for observation were located in urban areas and were found in three different educational zones. The observations were conducted in Form 3 classes (with 14-year-olds), and the teachers were observed in sequential lessons; each lesson lasted for about 70 minutes and occurred once or twice weekly.

Overall, 31 classroom observations were accomplished. Three lessons involved pilot observations for familiarisation purposes (as explained in section 4.5.6) and were not integrated into the findings. Observation findings were collected from 28 lessons: 10 from Mansfield school, 10 from Rayfield school and eight from

Mayfield school. Two sessions, out of the 28 sessions, involved class tests at Mansfield and Mayfield, and another session, at Mayfield, entailed providing feedback on the class test. The findings from these three sessions were presented independently under the sub-theme feedback on test activities (see section 6.3.3).

The three D&T teachers were selected based on their range of experience: least, middle and most number of years of teaching experience. A brief background of each teacher is provided, indicating that they all possessed professional teaching qualifications and were experienced and committed teachers of D&T.

Bronn was the teacher with the longest period of teaching experience (16–20 years). As a student, Bronn studied Geometrical and Mechanical Drawing at School Certificate (SC) and Higher School Certificate (HSC) levels. The qualifications that Bronn held in D&T were a Teachers' Diploma and a Bachelor in Education. Bronn previously taught D&T for five years in a private-aided secondary school. He attended two workshops: Empowering Teachers for Quality Teaching in 2006 and Assessing Coursework in D&T in 2011. Ten observations were recorded in Bronn's class (Mansfield), which consisted of eight boys and two girls.

Reed, the participant with moderate teaching experience (11–15 years), had no experience as a student in D&T at SC and HSC levels. He held a first degree in Mechanical Engineering and a Postgraduate Certificate in Education in D&T. Reed taught D&T in a private-aided secondary school for two years before joining the state's institutions. Reed had never attended any workshops related to teaching, learning or assessment. Observations of 10 lessons taken in Reed's class (Rayfield), which consisted of 22 boys.

Renly had the shortest period of teaching experience (5–10 years), gained only in state secondary schools. As a student, he studied Design and Communication at SC and D&T at HSC. Renly held a Teachers' Diploma and Bachelor of Education in D&T. In 2015, he attended one workshop based on 'good practices in D&T'. Eight observations were carried out in Renly's class (Mayfield), which consisted of 12 boys and four girls.

Both deductive and inductive strategies were used to capture the emerging themes and sub-themes that are reported in this chapter (as explained in section 4.6). First, the deductive framework was utilised. Wylie and Lyon's (2013) ten categories, used to structure the observation grid (see Appendix H), were employed as guidelines to generate categories. Black and Wiliam's (2009) five key strategies of formative assessment and the Assessment Reform Group's (1999) seven characteristics of 'assessment for learning' (refer to section 2.1.6) were then used to group common categories. Afterwards, the inductive analysis was used, and when recurrent ideas were identified, these were clustered. Descriptive statistical analysis, which was merged with thematic analysis, was conducted with the intent of conveying important features of the quantitative data gained from the multiple data sources. Five themes (each consisting of sub-themes) were obtained by combining the multiple data sources through analytical reflection and categorisation of the patterns, which demonstrated the three D&T teachers' habits in implementing 'assessment for learning'. The NVivo 11 software was used to visualise, analyse, organise and store the multiple data sources obtained from teachers' practices in the classroom. The statistics (percentages) displayed in this chapter represent the 25 observations (excluding tests and feedback sessions) of the three teachers.

The chapter is structured into five sections, and each section presents a theme informing how the D&T teachers used 'assessment for learning' in their classrooms. The five broad themes emerging from the multiple data sources of the classroom practices were as follows: clarifying and sharing learning intentions and success criteria, developing classroom discussions and learning tasks that elicit evidence of students' learning, providing feedback to learners, promoting learner autonomy, and teachers reviewing and reflecting on assessment information.

## **6.1 Clarifying and Sharing Learning Intentions and Success Criteria**

Clarifying and sharing the learning intentions and criteria for success with students is considered necessary when enacting 'assessment for learning' because students are more likely to learn when they understand the learning intentions and criteria for success (Wylie & Lyon, 2015). The findings in this section helped to understand



what ‘assessment for learning’ guidelines the D&T teachers used in their classrooms, whether they clarified and shared the learning intentions and success criteria, and how their ‘assessment for learning’ practices were framed. Two sub-themes—learning intentions and success criteria—elaborate how the D&T teachers clarified and shared the learning intentions and criteria for success to the students.

### **6.1.1 Learning intentions**

‘Assessment for learning’ begins when teachers conceptualise and communicate clear learning intentions, not only by telling or writing them but by ensuring that students understand the meaning of those intentions, which become targets that students aim for (Brookhart, 2011; Chappuis & Stiggins, 2016). In short, the students should know: “where am I now? ... where am I going? ... and ... what strategy or strategies can help me get to where I need to go?” (Moss & Brookhart, 2009, p. 8).

The classroom observations of the three teachers indicated that they verbally presented an agenda for every lesson when the class started. The teachers commented on what content would be covered (agenda) without describing what the learners should be able to understand or do (learning intentions). During 24 lessons (96.0% of total time), the teachers did not mention the learning intentions (or objectives) at the beginning, during nor at the end of the lessons. At the end of only one lesson, Bronn mentioned a learning intention, but without being specific; for example, “You should be able to do these angles” (FN3.L4:5). Bronn drew several angle problems on the board, which he gave as homework. In the next class, when the students came back with their homework, they had used a different approach to complete the tasks. Bronn considered the students’ approach was inappropriate because the students used a protractor to draw the angles, instead of using a pair of compasses to construct the angles. This scenario demonstrates that the teacher and students did not have a shared understanding of the learning intention, which was vague.

When the lesson’s agenda and learning outcomes are shared with students, the teacher is also expected to help students relate to previous learning (Moss &

Brookhart, 2009). Observations revealed that during 23 lessons (92% of total observation), the teachers made superficial procedural connections by mentioning what they did in previous lessons. Bronn and Renly made links between their previous lessons only at the beginning of two lessons (8%) through warm-up questions, which mostly verified if the students could recall facts; for example, Bronn asked, “What do we call a polygon with three sides?” (O3.L4.18:45).

It was evident that none of the teachers referred to their teaching plans during the lessons. An analysis of Reed’s plans suggested he did not prepare learning intentions. His plans (weekly plans and records of work) did not contain any learning intentions, as shown in Figure 6.1; lesson plans were not prepared either. Informal interviews with Reed revealed that the same plans were used, with adjustments of dates and years, for several years. Reed indicated that he did not “refer to the *National curriculum framework: Secondary* [(NCFS)] for any planning” (I.I.T2.L9:1), but merely used the required textbooks and past examination questions from which he identified questions related to the topic he taught.

WEEKLY PLAN OF WORK - Year :...2016				
Term:.....1..... Week: .....5..... Date: From Monday ...08/02... to Friday ...12/02...				
S	TOPIC / SUB TOPIC	RESOURCES MATERIAL	C/WORK H/WORK	REMARKS
	Introduction to oblique projection	Notes from mie textbook	Working on the A3 papers given	

Figure 6.1 Reed’s weekly plan without learning intentions (SD.T2.L4.P5)

Bronn wrote his weekly plans after the lessons, and on several occasions, he would complete the document after two or three lessons when I asked to photograph documents for my records. This scenario implied that Bronn used the weekly plan (see Figure 6.2) not to prepare teaching, learning and assessment, but for documentation purposes (accountability). An informal conversation with Bronn revealed that he never referred to the NCFS when he wrote his lessons, but merely referred to the particular textbooks and/or syllabus.

Weekly Scheme of Work for 14 Mar - 18 Mar

Subject: ..... Class: .....

**I. Topic/Chapter<sup>1</sup>**

Date	Topic/Chapter	Objectives <sup>2</sup>

**II. Teaching Methods<sup>3</sup>**

.....

**III. Media Used<sup>4</sup>**

.....

**IV. Classwork/Homework/Evaluation Test**

Date	Textbook	Page	Exercise	Work set on blackboard/dictated by teacher

H.O.D Remarks & Signature

School Administrator/Rector/Deputy Rector Remarks & Signature

Figure 6.2 Bronn's first weekly plan two after he completed his lesson (SD.T3.L8.P.15)

An analysis of Renly's documents suggested that he planned learning intentions/objectives. However, Renly's daily and weekly plans (for two lessons) indicated that these contained the similar learning objectives that were written in a language appropriate for the teacher only. These learning outcomes were vague and not categorised (conceptual, technical, procedural and societal), as shown in Figure 6.3 and 6.4. The document analysis revealed that Renly did not plan specific, measurable, achievable and realistic learning targets.

Topic/Chapter PLANE GEOMETRY (Ellipse)

**Objectives:**

① Develop fine motor control

on ellipse using the auxiliary circles and radial

method.

**Prior Knowledge**

Skills in drawing

**Teaching Aids**

**Teaching Strategies**

Deconstructing

Figure 6.3 Renly's learning objective for lesson one (SD.T4.L4.P.12)

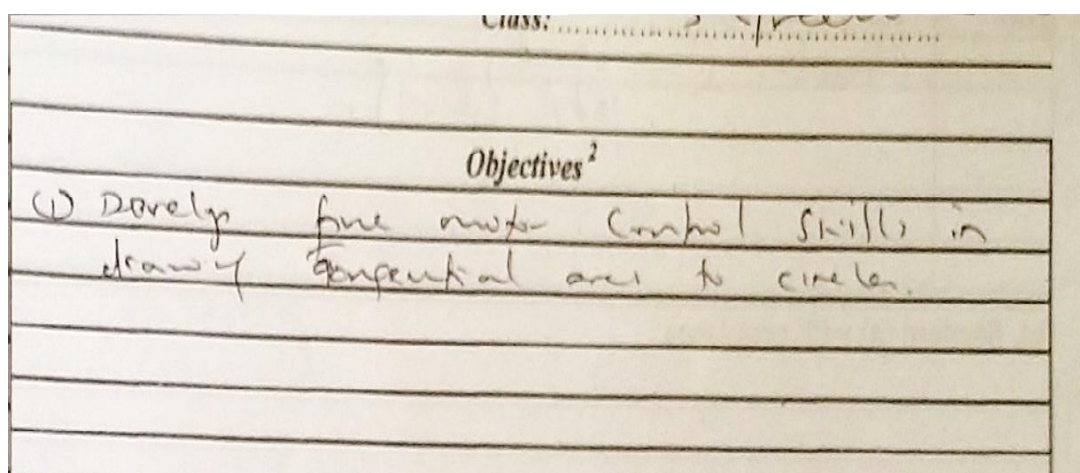


Figure 6.4 Renly's learning objective for lesson three ( SD.T4.L4.P18)

An informal interview with Renly revealed that he consulted the NCFS to plan his lessons to ensure “if every [topic] was covered” (I.I.T4.L6:1) as per the document. Yet Renly agreed that he was not referring to the curriculum goals when writing the learning intentions.

### 6.1.2 Success Criteria

Apart from understanding the learning intentions, learners should be able to recognise what suitable work looks like, as it helps them to know what is required to achieve the set targets successfully (Brookhart, 2011). The observation findings highlighted that the teachers shared the criteria for success with the learners without any planning. The teachers mentioned the criteria for success to the students during their explanations without referring to or using rubrics, contracts or checklists. The teachers also occasionally wrote technical terms on the board to indicate specific criteria before the students attempted assessment tasks. Despite the teachers not sharing the criteria in an orderly manner and fully, they were appropriate for the particular lesson and were expressed in student-friendly language. For example, Bronn mentioned the difference between regular and irregular polygons, but the difference between line types and the importance of using a sharpened pencil were not emphasised.

It was rare to observe teachers sharing or developing examples of quality work with students. Only one teacher, Renly, conducted demonstrations of activities on A3 paper, on three occasions, to share the criteria for success. The informal interview with Renly demonstrated that he intended to show the students what proper work resembled. Renly later asked the students to apply these criteria to their tasks on which he provided individual feedback (further discussed in section 6.3), related to the criteria for success when reviewing their work. However, Renly did not involve the students in any discussion or allow them opportunities to generate the criteria for success during the demonstration; the criteria were shared verbally.

The observations showed that the students were mostly given opportunities to internalise the criteria for success through activities (classwork and homework) set by the teachers. Bronn and Renly set several activities to provide students with opportunities to internalise the criteria effectively, but not all students seemed to comprehend and engage with the criteria when attempting the activities. Conversely, Reed did not provide enough practice for students to internalise the criteria, resulting in many students not engaging with the criteria in meaningful ways. During an informal interview, Reed pointed out that spending a lot of quality time on one task was enough for the students to gain the required skills.

Figure 6.5 is an example of the marking criteria Renly used to allocate marks to one activity. However, Renly did not plan and share these criteria with the students. The criteria for marking were planned just before Renly started marking and correcting students' tasks. The criteria for marking, shown in Figure 6.5, indicates that the distribution of marks for each criterion was not determined. So there was no clear indication of how the teacher proceeded for the allocation of marks for different levels of performance. When the corrected task was returned to students, Renly did not share the marking criteria on their sheets (or verbally), but the marks were indicated with a comment on some scripts (an example is shown in Figure 6.6). Thus, the students were not aware of the criteria on which they were assessed, and in what area they needed to improve.

<u>ellipse - marking scheme</u>	
- centre lines	2
- Minor major axis	4
- drawing of circle & tangent	4
- <sup>locate</sup> points of the ellipse	6
- sketching of ellipse	5
- neatness and accuracy	3
<u>total</u>	<u>25</u>

Figure 6.5 Renly's marking scheme used to allocate marks for an activity (SD.T4.L8.P6)

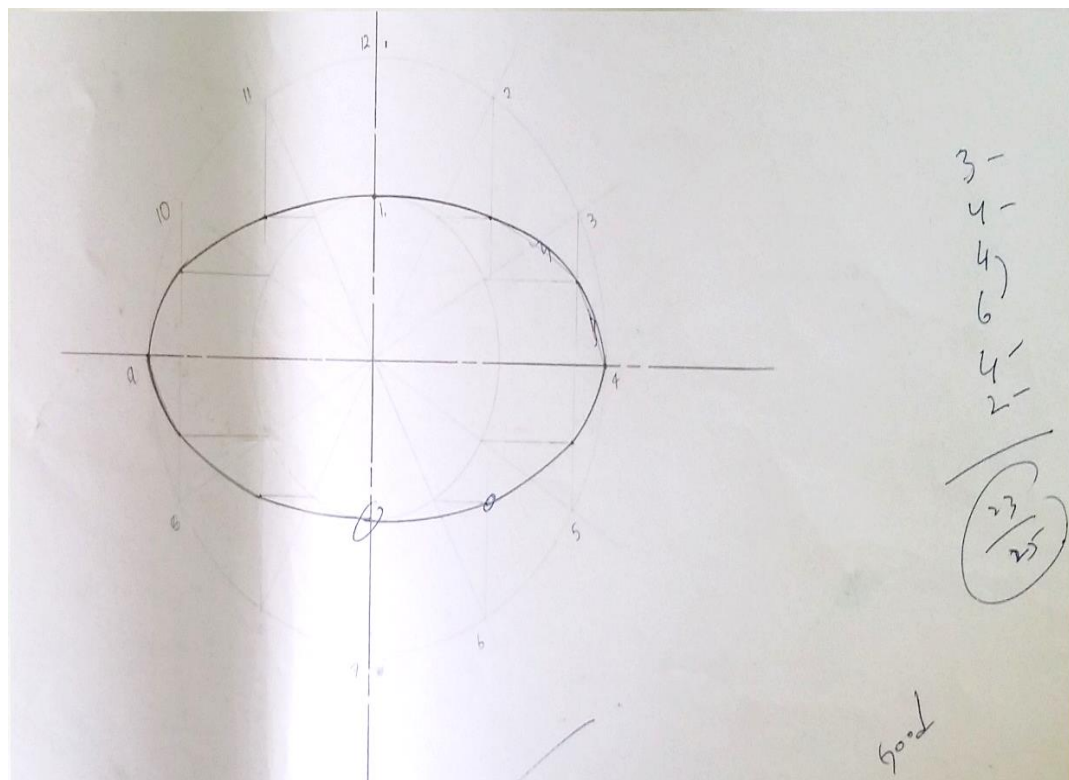


Figure 6.6 An example of a student's answer corrected by Renly where the marking criteria were not shared with the students (SD.T4.L9.P31)

Both Reed and Bronn did not use any marking criteria to allocate marks. When questioned about the marking criteria during an informal interview, Bronn responded that he usually corrected students' test activities and gave marks by following the marking criteria but this time he "could not prepare the marking

criteria and mark accordingly due to [unforeseen] difficulties” (I.I.T3.L11:1). However, Bronn did not share any previous marking criteria.

The findings under this theme revealed that the teachers seldom clarified and shared the learning intentions and the criteria for success. Instead, they focused on presenting the content of the lessons. The teachers occasionally referred to the learning intentions, but these were often vague and done verbally. When the teachers shared the criteria for success, they went about it randomly and often missed out a few potential criteria.

## **6.2 Developing Classroom Discussions and Learning Tasks that Elicit Evidence of Students’ Learning**

After the learning intentions and criteria for success are clarified and shared with students, the next step of ‘assessment for learning’ is to know where the students are in their learning (Wiliam, 2011). Hence teachers mainly collected evidence through discussions, questions and learning tasks (through various methods) that aligned with the learning expectations. Findings under this theme helped distinguish the ‘assessment for learning’ guidelines that the D&T teachers used and their rationale for implementing assessment that indicated how the teachers’ ‘assessment for learning’ practices were framed. Two sub-themes under this section describing how the D&T teachers developed effective classroom discussions and learning tasks include activities to obtain evidence of students’ learning, and discussions and questioning strategies.

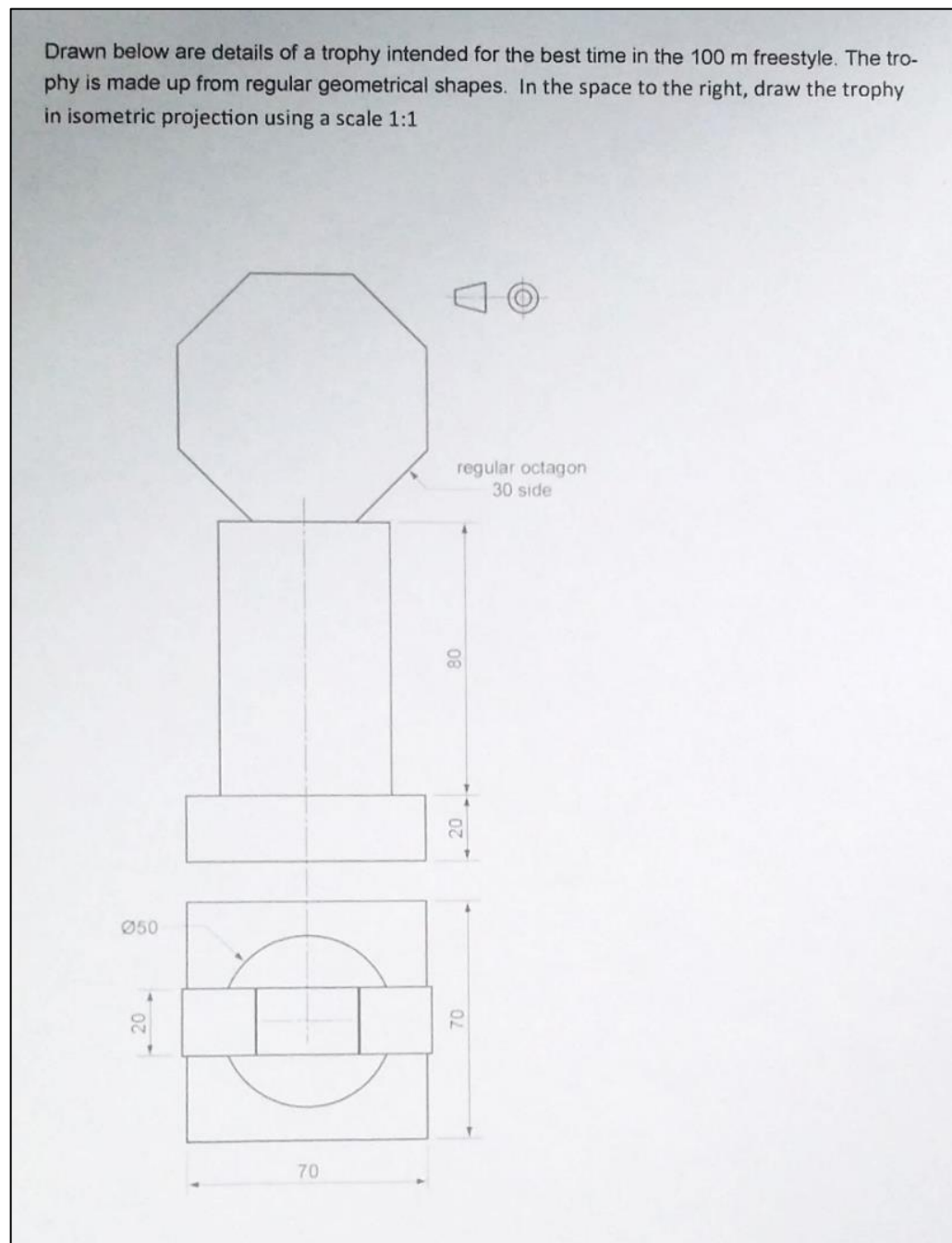
### **6.2.1 Activities to obtain evidence of students’ learning**

The observations revealed that the three teachers used appropriate activities that were aligned to the lessons’ content, which provided evidence of students’ progress towards set goals. Both Bronn and Renly selected activities from textbooks and developed activities, aligned to the lessons’ agendas, for the students as classwork and homework in each lesson.

However, even if the activities provided by Reed were adequate, not enough evidence was gathered on students’ learning. The observations revealed that Reed



gave one activity as classwork (from past examination questions or textbooks (see Figure 6.7), and students worked on the same task for two lessons. Consequently, the students in Reed's class attempted five tasks in 10 lessons. Reed never gave any homework to the students or asked the students to try and complete the given task at home. He mainly explained some drawing techniques and asked the students to repeat the drawing procedures.



*Figure 6.7* An example of an examination question Reed set as classwork for which marks were given (SD.T2.L9.P1)



The observations showed that the teachers used activities to obtain evidence of students' learning. During three lessons, Renly systematically reviewed all the students' activities by recording the students' names and task numbers to ensure that feedback about their activities was provided to them. During 21 lessons, the three teachers reviewed students' activities throughout the lessons in ways that provided insights into most students' progress. However, occasionally, throughout one lesson, Reed reviewed his students' activities.

The results indicated that all three teachers made inferences on students' progress when activities were set. However, the three teachers occasionally missed opportunities (during 14 lessons or 56% of total time) to make meaningful inferences on students' progress on the intended learning outcomes, while during 11 lessons (44%), the three teachers missed multiple opportunities. For example, if the teachers made inferences on the learning outcomes about the tasks, then the students could identify where they were and where they were heading in their learning. However, the teachers' focus seemed to be on completing their teaching and the set activities, without attempting to adapt their teaching to improve students' learning.

Two teachers, Bronn and Renly, also used classroom tests to obtain evidence of students' learning. The teachers set these tests after completing one topic. However, the teachers used different assessment approaches. Renly selected an activity from the textbook, while Bronn developed a set of questions, which he displayed on the board. Figure 6.8 shows a draft of Bronn's test activities.

### Form 3 Test

#### Polygons

1. Construct a regular hexagon given length of 1 side is 47 mm. 8
2. ~~Given distance~~ At Construct a regular octagon given distance Aff is 25 mm. 10
3. Construct a regular heptagon given the length of 1 side is 35 mm. 14
4. Copy the given figure showing clearly the method used to obtain the regular pentagon shade the drawing to show a nice pattern of your own design. 18

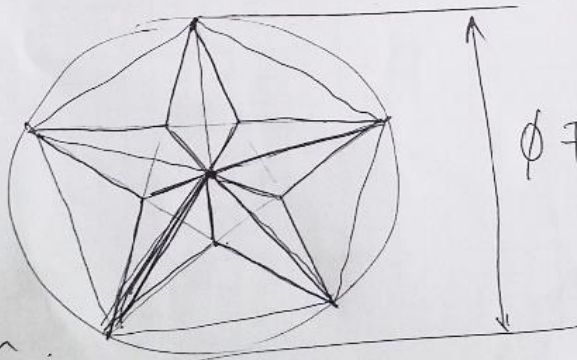


Figure 6.8 A draft of the set of questions Bronn developed to collect evidence of students' learning (SD.T3.L11.P2)

#### 6.2.2 Discussions and questioning strategies

According to Wylie and Lyon (2015), discussions and questions used when implementing 'assessment for learning' should be aligned with the learning intentions. Discussions and questions are among several strategies used to check students' learning and identify their misconceptions.

One leading approach of questioning is to ask them at the appropriate time. The observations indicated that during 12 lessons (48% of the classes observed) the teachers asked about five questions and during nine lessons (36%), they asked one or two questions at appropriate points to check students' prior knowledge and identify misconceptions. During four lessons (16%), Bronn asked 10 to 15 questions at appropriate points, thus allowing the students to gain a good understanding of the concepts taught.

An alternative questioning approach is to put questions in such a way that all students need to think about each question (Wiliam, 2011). The observations revealed that all three teachers posed oral questions to the whole class. Usually, a student who knew the answer responded. Sometimes all students answered together, which made it difficult to distinguish who said what. Only Bronn and Renly occasionally targeted a student, who was expected to respond, once they set the question. During two lessons, Bronn did not question the whole class. Instead, he targeted a particular student. Similarly, in two lessons, Renly did not ask any questions before, during or after his explanations. Instead, once his explanation was over, he asked the students if they had any questions, and the students responded, "no" (FN4.L6:2).

Another essential feature of questioning to obtain quality evidence about students' thinking and misunderstandings is by providing the appropriate wait time for students to access information. In Gregory's (2016) view, the human brain requires a minimum of 5–7 seconds to retrieve information stored in the memory, and thus formulate an answer. The findings showed that Bronn and Renly provided more appropriate wait times than Reed. Both Bronn and Renly mostly provided about 7–10 seconds wait time to allow the students to engage with the oral questions. Conversely, Reed only provided about 4 seconds of wait time. However, all three teachers often answered their own questions before any student could respond.

The observations also suggested that although the teachers monitored students' works on a regular basis, they were not using questioning strategies effectively to collect evidence of students' misconceptions. Reed rarely questioned students when

they had difficulties; Renly used questioning strategies that provided evidence for only a few students; while Bronn was inconsistent in using questioning strategies which were not systematically structured for students to benefit. The three teachers mostly focused on indicating the steps to complete the activities.

In one session, Renly interrogated the whole class over a previously taught concept, and most students responded positively. However, when monitoring the activities, Renly noticed that some students struggled. Accordingly, Renly questioned, “Who have [sic] forgotten the technique of division of a line?” (FN4.L4:4), and only four students raised their hands. When Renly requested these students to attend a demonstration at his desk, he appeared surprised to see 10 students in front of him, keen for guidance, which indicated his approach of questioning (using closed rather than open questions) did not allow him to gain accurate details about students’ difficulties.

When implementing ‘assessment for learning’, teachers are supposed to make inferences about students’ progress through discussions and questioning. However, the observation findings showed it was only during four lessons (16% of total time) that the teachers developed opportunities to make inferences about learners’ progress and adapt their teaching appropriately, while during 21 lessons (84% of the total class time) the D&T teachers missed opportunities to make inferences about students’ progress through discussions and questioning in relation to the set goals. There were times when it would have been more beneficial for students’ learning if the teachers had seized the opportunities to discuss the students’ challenges and their progress in the activities. But the teachers continued with using approaches to assessment where discussion was not favoured, and not much adaptation of teaching was made, even when many students struggled with activities.

The findings under this theme revealed that the teachers used appropriate activities to obtain evidence of students’ learning. However, the teachers set the same tasks for all the students irrespective of their learning needs and used a narrow range of assessment methods. The findings also suggested that the teachers were regularly monitoring students’ work, but were not effectively implementing discussions and

using questioning strategies to gain evidence of students' thinking and misunderstandings, as well as allowing them to reflect on the D&T activities and concepts. The students were rarely involved in asking questions; they were mostly concerned with whether their activities had been carried out properly. Moreover, the teachers were not encouraging the students to ask questions or participate in discussions.

### **6.3 Providing Feedback to Learners**

Feedback and 'assessment for learning' go hand in hand (Fluckiger, Vigil, Pasco, & Danielson, 2010). Therefore, for Moss and Brookhart (2009), when implementing 'assessment for learning', teachers need to provide feedback on students' learning based on evidence collected from learning tasks and conversations. Feedback is also provided with the intention to motivate students to learn and improve their learning. The D&T teachers provided feedback based on the criteria for success from the set learning agendas, and/or learning intentions that they prepared. Findings under this theme were useful in indicating what guidelines and rationales the D&T teachers used for implementing 'assessment for learning', and helped explain how the teachers' practices were framed. Four sub-themes describing how the D&T teachers provided feedback to their learners are as follows: individualised verbal feedback on students' work, individualised written feedback on students' work, feedback on test activities, and feedback to motivate students.

#### **6.3.1 Individualised verbal feedback on students' work**

The teachers mostly provided verbal feedback on students' ongoing work (at students' desks). When monitoring the students' work, the three teachers regularly identified the students' mistakes and told them what they needed to do next and how they needed to solve the problem or how to apply the concepts. The teachers rarely asked questions when providing feedback. For example, Renly noticed a weakness and instantly said, "This line should be thicker. Thicker and darker. Apply some pressure" (FN4.L6:3).

When providing individualised verbal feedback at students' desks, the teachers were also involved in individual verbal exchanges. During five lessons (20% of the

total time), there were few (1 or 2) verbal exchanges between the teacher and the student. During 15 lessons (60% of the overall class time), there were 4 to 7 verbal exchanges compared with 8 to 12 for the remaining five lessons (20%). During these verbal exchanges, the students mainly asked their teachers questions to obtain specific and detailed answers. For example, one student asked, “Sir, what angle should be used?” (O2.L3.33:35), and Reed responded without delay, “45 degrees, we are drawing an oblique projection” (O2.L3.33:37). However, when the teachers questioned the students, they only occasionally built on students’ responses.

The observations also demonstrated that whenever the three teachers were involved in providing verbal feedback on students’ tasks, the feedback were short and often ended abruptly. The feedback during questioning did not allow a full exploration of the ideas or issues discussed. During the feedback, the teachers occasionally built on students’ responses to encourage them in their learning. During 11 lessons (44% of the total time), the feedback of the three teachers happened to turn into a conversation where there was an in-depth and meaningful exploration of several ideas, but the teachers always ended in providing a statement of the correct answer. Bronn and Reed were mostly involved in such conversations.

### **6.3.2 Individualised written feedback on students’ work**

Since the observed lessons were based on the D&T component of ‘graphic products’ (explained in section 3.1.2), the written feedback was not only in the form of comments, but also in the form of freehand sketches and demonstrations (drawings that were accomplished by using instruments such as T-square, a pair of compasses and set squares). The observations showed that when providing written feedback, the three teachers frequently used drawings and/or sketches to explain or discuss concepts that students struggled to understand. The teachers mostly gave brief and quick demonstrations.

Bronn and Renly provided individualised written comments, and Reed gave none. However, Bronn and Renly provided written feedback in the form of sentences only when they called students to their desk to present the completed activities. Figure 6.9 shows an individualised comment by Renly, which also indicates that the

feedback was not in question form to allow students to think critically, but as answers or guidelines for improving the task. Bronn provided fewer written comments; he only wrote some technical terms, often one or two words, as shown in Figure 6.10.

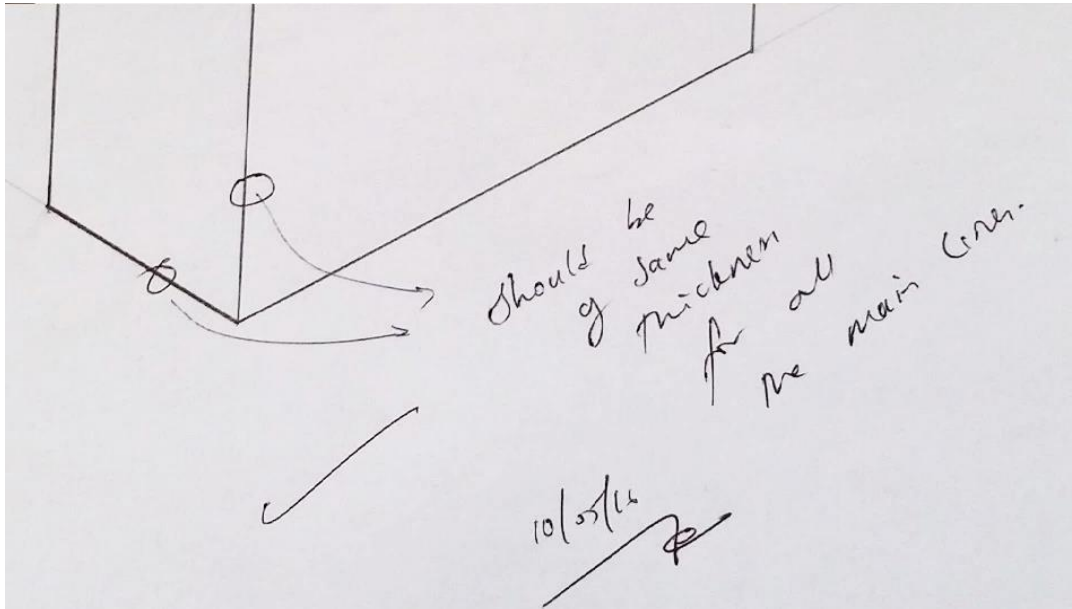


Figure 6.9 An example of Renly's comments when verifying students' completed work at his desk (SD.T4.L6.P4)

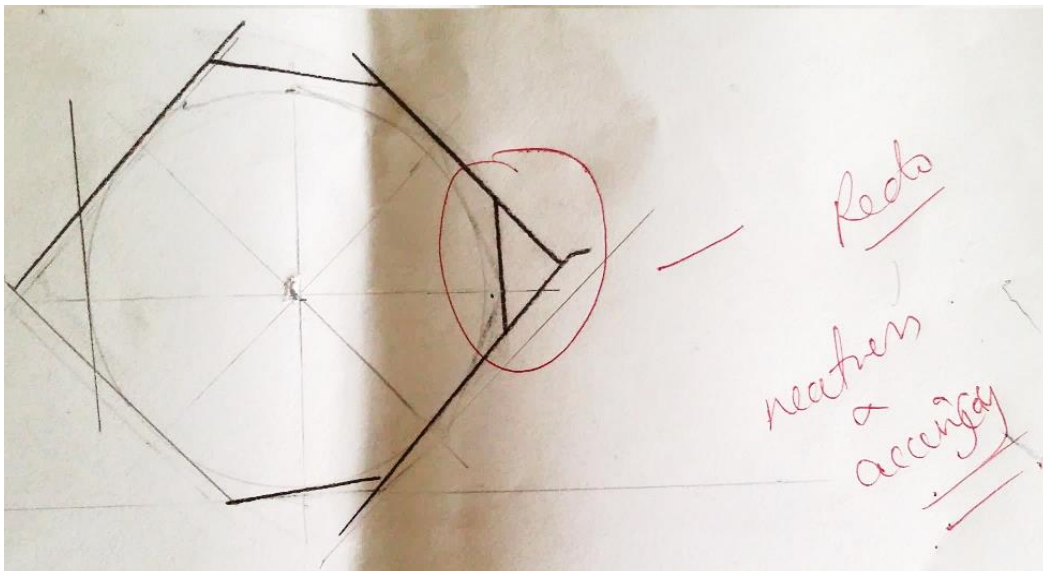


Figure 6.10 An example of Bronn's comment when verifying students' completed work at his desk (SD.T3.L9.P40)

The teachers' written (including allocating marks) and verbal feedback on completed tasks were not timely. Renly and Bronn usually called their students to their desks within two weeks to verify the tasks. The students who struggled with the tasks took more time to have their work checked by their teachers. However, Reed took nearly three weeks to mark the completed work and provide verbal feedback and a score.

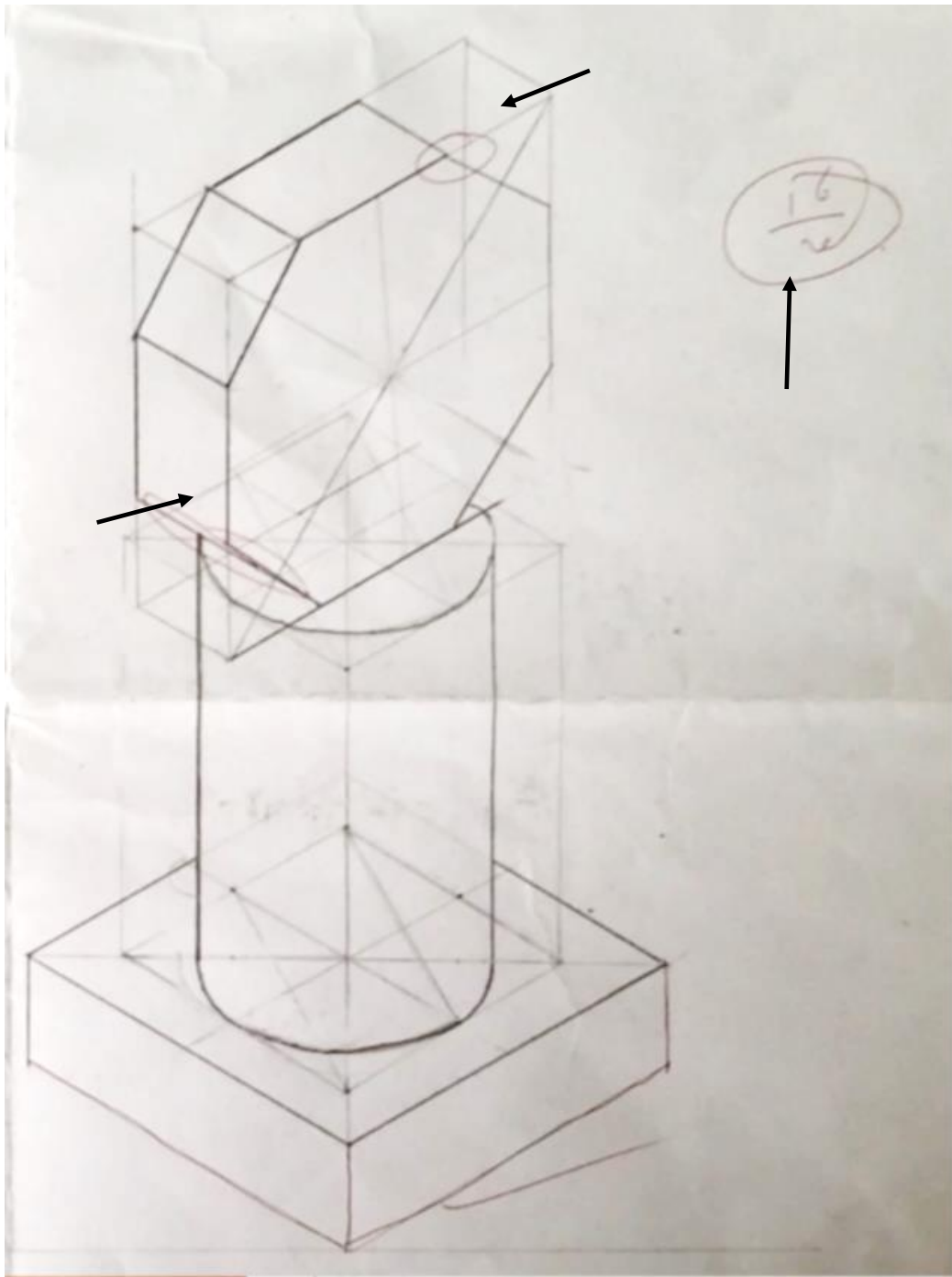
In some instances, several students did not receive feedback. Only Renly and Reed recorded students' completed tasks (see Figure 6.11). Thus, they were able to check if any student's activities had not been verified. Bronn was not recording this information; so, for example, if a student was absent when he checked the completed work and/or a student was not willing to show his/her work, then the student would not receive feedback. This episode of students not showing their activities happened several times in Bronn's classes.

	SURNAME	18	20				
1		13					
2		11	18				
3		10	17				
4		14					
5		15	20				
6		15					
7		17	20				
8		17	20				
9		15	20				
10		17	20				

*Figure 6.11* An example of Reed's recording (scores) that allowed him to identify if students' completed works were checked (SD.T2.L1.P1)

The findings revealed that during the lessons, the teachers provided feedback without a score (or grade). The feedback was based on the lesson agenda and (often unspecified) learning goals that also reflected the criteria for success. However, because Reed also collected marks on students' work—as he did not use tests—he called the students to his desk and allocated scores on their completed tasks (refer to Figure 6.12) and recorded the same in his mark book (see Figure 6.11).





*Figure 6.12* A sample of Reed's feedback (indicated by the arrows) after checking a student's completed work at his desk (SD.T2.L11.P15)

Renly also allocated marks on selected students' work, which he collected and marked during non-teaching periods. Renly marked these activities and provided written comments and marks that he later handed to the students. Renly returned the marked activity individually by calling each student to his desk where he briefly

mentioned (verbally) the mistakes of the students and asked them to refer to the comments that he wrote on their work as shown in Figure 6.13.

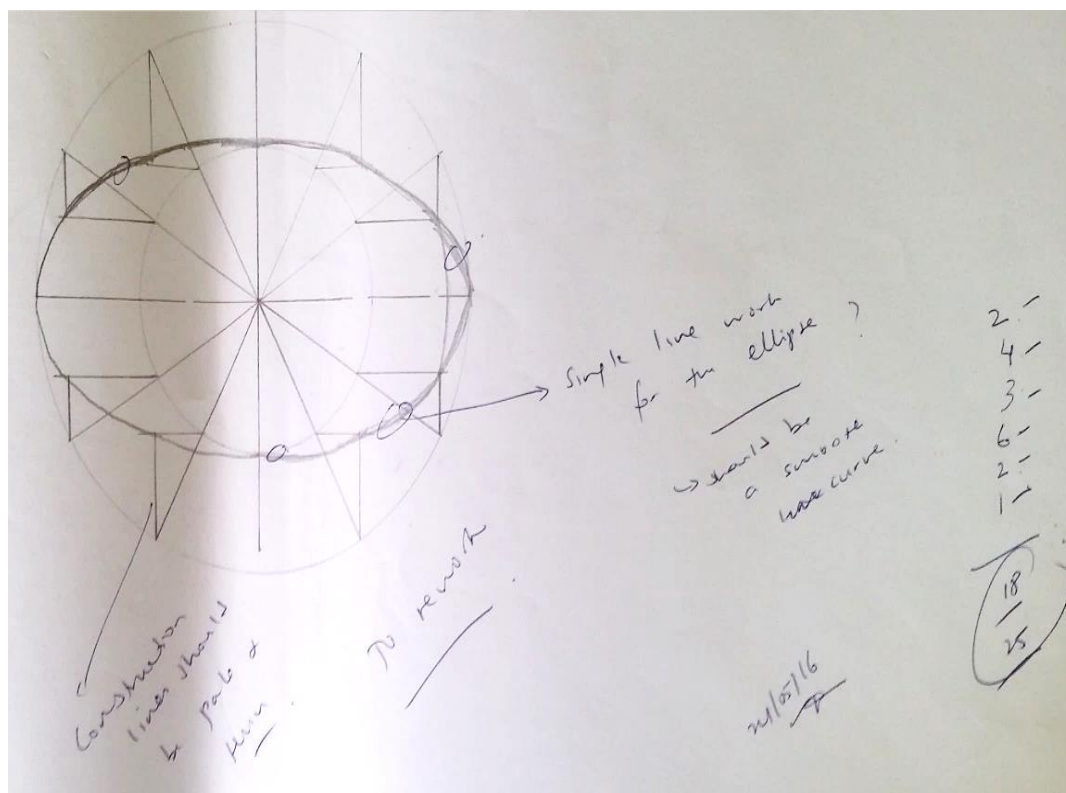
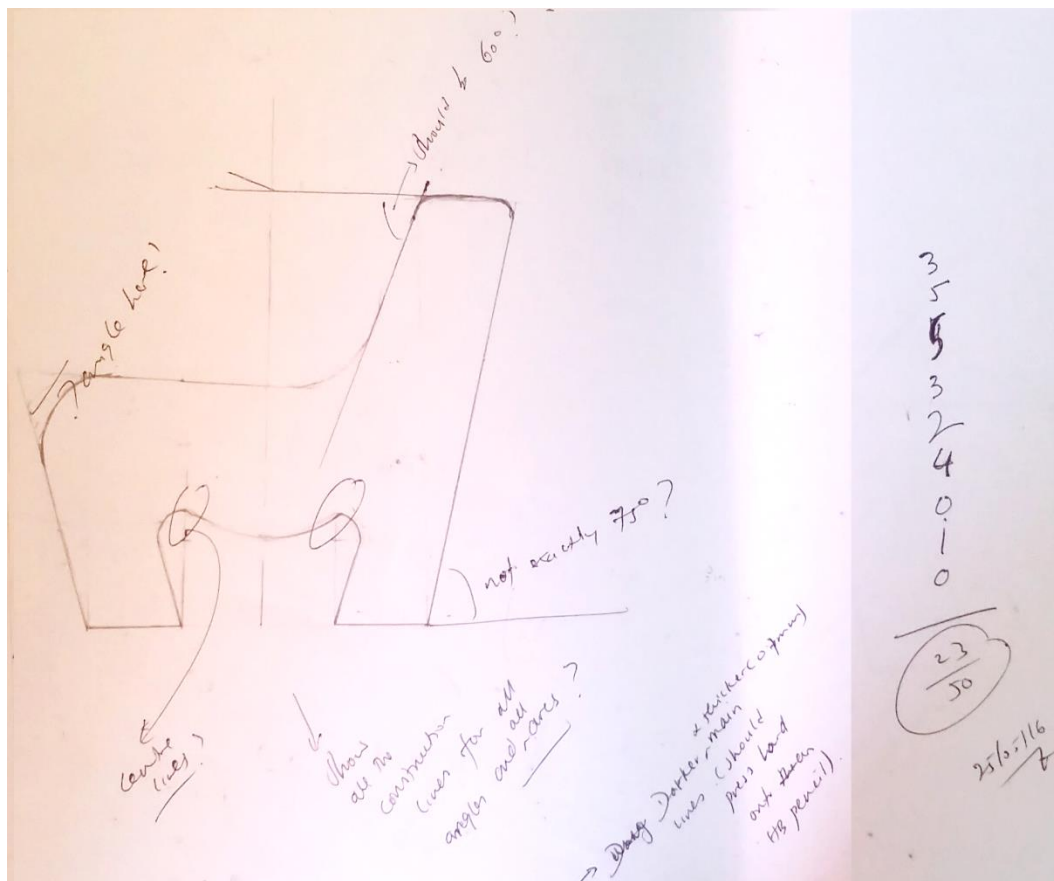


Figure 6.13 A sample of Renly's comments and score after checking a student's completed work at his desk (SD.T4.L9.P.26)

### 6.3.3 Feedback on test activities

Two teachers, Bronn and Renly, conducted a test at the end of each topic. Both teachers provided feedback in the next teaching session (two days for Renly and three weeks for Bronn). The delay in feedback from Bronn occurred due to some unforeseen difficulties. Both teachers provided verbal and written feedback. Samples of Renly's and Bronn's comments are shown in Figures 6.14 and 6.15, respectively. Additionally, Bronn also provided feedback in the form of sketches as illustrated in Figure 6.15. The written feedback of the two teachers was mostly to indicate to students what should be done and how it should have been done to complete the task successfully. Marks were also included on the students' scripts when feedback was provided.



The verbal feedback from two teachers was mostly one-way. The teachers focused on what mistakes the students made and how the task should have been done. The approach of Bronn and Renly differed. Bronn provided verbal feedback for about two minutes to each student on the four test activities, whereas Renly gave quick verbal feedback to each student for about 5–15 seconds. Renly only handed the scripts to the students and asked them to refer to his comments.

Renly: Ram, here are your mistakes. Don't you know how to draw construction lines? (O4.L9.3:10)

Ram: Yes. (O4.L9.3:16)

Renly: Diya, you too, not all construction lines are shown. I have written all the comments, you read them. (O4.L9.3:18)

Even though Bronn's feedback was more detailed than Renly's, he did all the talking and mainly emphasised students' weaknesses. Bronn also briefly stated that a particular activity was correct without providing specific details. For example, Bronn mentioned to Mike:

For the first question, it is good, and I gave full marks. But, for the second activity, you were supposed to construct an octagon across flats, [and] you have done the construction across corners, that is why you have lost some marks. For the third activity, I see too many lines. You have mixed two construction methods. (O3.L11.14:25)

Then in a few words, Bronn stated what lines should and should not have been used. Bronn also commented on the marks allocated to the students. For example, Bronn said,

For the third task, it is not okay. Again, you mixed two drawing methods. You got 27 marks out of 50. (O3.L11.15:12)

Occasionally, Bronn also encouraged students to comment if they had additional difficulties. However, the students' answers were short. Still, Bronn did not try to

confirm whether the students were right or hesitated to mention their difficulties or were unaware of their difficulties. For example, in one case:

Bronn asked: [Jane], what happened? Why did you not complete this activity? (O3.L11.15:55)

Jane responded: Sir, I did not have enough time. (O3.L11.15:58)

When providing the feedback, Bronn regularly explained to students strategies they could adopt to gain marks. For example, Bronn claimed,

[Arnold], if you leave it blank, you will get zero marks, and if you draw some lines, at least you can get some marks. (O3.L11.17:52)

Even if Renly's verbal individualised feedback was short, he first gave general comments to the whole class regarding the test activities. However, Renly's comments to the class focused on what he disliked. He did not discuss students' strengths or praise them for their effort, but briefly mentioned some weaknesses. For example, Renly exclaimed in quite a loud voice,

In general, I am not satisfied with the way that you worked because you skipped mainly the construction lines. How to construct an angle of seventy-five degrees? You do not know how to construct it. I did explain to you. (O4.L9.1:35)

[Concerning the activity of] 'arcs joining a circle', again, most of you have not done all the construction lines... there were many mistakes. (O4.L9.2:40)

When the teachers provided feedback on the test activities, they did not seem to motivate their students, except selected bright students. There were, however, other occasions when the teachers used feedback to motivate their students, which are explained in the next section.

### **6.3.4 Feedback to motivate students**

Chappius and Stiggins (2016) claim that motivation gained from ‘assessment for learning’ practices is essential for students’ learning. This motivation may come from various channels, such as during questioning, practicals and discussions. The findings revealed that when conducting ‘assessment for learning’, the three teachers were not using the motivation strategies effectively to boost learners’ confidence in their learning. The teachers rarely attempted to encourage the students to keep believing that success is within their reach if they strived harder. The teachers also seldom used students’ responses to praise and motivate them. Even when giving feedback, the teachers emphasised students’ weaknesses rather than their strengths.

According to Gregory (2016), when students are allowed to identify quality work, they develop an understanding of the learning expectations. Also, when students’ activities are used as examples of quality work, these students gain confidence and are empowered to move forward. However, the observations indicated that none of the three teachers used their students’ quality work as examples to (1) provide an example of the learning expectations, (2) motivate weak students that the task was doable, or (3) inspire the bright students to keep working hard.

Often, the teachers passed comments that could negatively affect students’ learning. For example, after explaining a drawing concept, Bronn mentioned to the students, “If you come with the same problem, then there is [something wrong] with you” (FN3.L2:2). Such feedback from the teacher is likely to be a disincentive for students to seek assistance. From such comments, students who have learning difficulties might think that they have some deficiencies.

However, occasionally the teachers motivated the bright students only, through individual praising and encouragement. For example, one student asked Bronn to verify his task, and subsequently, Bronn responded, “It is good. You are completing the activities fast now” (O3.L8.43:40).

The findings under this theme revealed that the teachers’ feedback was vague, focused on students’ weaknesses rather than emphasising students’ strengths, and

stressed task completion and improvement. There was hardly any interaction when providing feedback, and teachers only occasionally motivated the bright students.

## **6.4 Promoting Learner Autonomy**

Autonomy is based on the belief that ‘assessment for learning’ is more effective when learners are actively involved. A key feature to develop learners’ capacity to monitor, organise and assume the responsibility for their own learning is to promote learner autonomy in the classroom (Blidi, 2017; Willis, 2011). Learner autonomy may be accomplished by assessing one’s own and peers’ activities and working collaboratively. However, teachers should deliberately provide personal and instructional support to help students develop a sense of autonomy (Stefanou, Perencevich, DiCintio, & Turner, 2004). The findings under this theme were helpful to understand the assessment methods used by D&T teachers and whether they considered learner autonomy when implementing ‘assessment for learning’. The sub-themes of collaboration, self-assessment and peer-assessment explain how the D&T teachers promoted learner autonomy when carrying out ‘assessment for learning’ practices in their classrooms.

### **6.4.1 Collaboration**

It is increasingly recognised that students can improve their learning by working collaboratively (Kendrick, 2010; Webb et al., 2008). The observations demonstrated that student-to-student collaboration was more evident in Reed’s classroom, compared to Bronn’s and Renly’s classrooms. An examination of Reed’s ‘assessment for learning’ practices indicated that during his 10 lessons, student-to-student collaboration was evident. In Bronn’s and Renly’s classrooms, during 12 lessons, there was no evidence of student partnership. In fact, Bronn regularly emphasised, “I do not want to hear anyone talking” (O3.L5.2:45), whereas Renly’s students were already quiet and seemed satisfied to work individually. Still, during the other three lessons—two lessons of Renly and one of Bronn—student-to-student collaboration was apparent. However, none of the D&T teachers promoted a collaborative spirit when implementing ‘assessment for learning’.

Observations of the teachers' 'assessment for learning' approaches indicated that Bronn and Renly valued student collaboration differently from Reed. During 16 lessons (64% of observations; Bronn nine lessons, Renly five lessons, and Reed two lessons), the classroom climate was characterised by the perception that the teacher was the one in full control. The teachers did all the talking and the students were not allowed to talk among themselves. However, during eight of Reed's lessons (32% of all classes), Reed was mostly in charge during the explanation. When Reed monitored the activities, the students discussed the concepts and activities by collaborating with their peers. The observations showed that students were discussing amongst themselves for about 50% of Reed's total class time. Renly allowed the students to freely discuss among themselves only during one lesson (4% of all observations). On that particular day, the lesson lasted for only 20 minutes due to the school assembly, so Renly allowed students to chat about previous set tasks.

The observation findings also suggested that 'assessment for learning' approaches that the teachers adopted did not promote an attitude of "we can all learn" (Wylie & Lyon, 2013, p. 45). Rather, there was a general classroom climate of 'not all students can make it'. When the majority of students grasped the learning from the set activities, the few who lagged behind did not always receive their teacher's support to accomplish the learning goals. In addition, the teachers did not favour the use of multiple approaches to teaching when implementing 'assessment for learning' to encourage all students in their learning.

When the D&T teachers questioned students, they occasionally encouraged the students to work together. During 15 lessons (60% of the total time), student collaboration was brief and limited to when the teachers asked questions, and the teacher did not exploit the students' responses or questions to deepen their learning. In the remaining 10 lessons (40%), Bronn and Renly explicitly encouraged the students to collaborate when questioned, but again they rarely capitalised on students' responses or questions to enhance learning.

There was an interesting scenario in Renly's classroom, where four students collaborated and sorted out their difficulties when the teacher was busy marking a



student's task. Nag asked Jack how to attempt one particular activity, and Jack explained it to him by showing how the pair of set squares should be manipulated. Nag then explained the set squares principles to Chum and demonstrated how the activity should be done, and discussed the mistakes they made. However, Chum then asked Jack about the dimensions and angles he used. Jack explained his viewpoint. Following their analysis, Chum and Gopal identified that Jack had applied the dimensions wrongly, and these students again had an in-depth conversation about the issue. Jack realised his mistake afterwards, and the problem was sorted out successfully amongst the students. Renly did not intervene as the students resumed attempting their activities individually.

#### **6.4.2 Self-assessment**

Self-assessment is part of 'assessment for learning' practices which involves students reflecting on the quality of their work and deciding the next steps for their learning (Earl, 2013; Gregory, 2016). The observation findings revealed that the three D&T teachers did not offer the students opportunities to engage in self-assessment. During the last informal interviews, when questioned about using self-assessment, the teachers claimed that, first, most of the students do not complete their classwork and homework, and second, they do not think the students are interested or have the required skills to self-assess their work. Bronn claimed that only one or two students in the class could self-assess their tasks, so it was not worth spending time on self-assessment.

#### **6.4.3 Peer-assessment**

Another leading 'assessment for learning' method is peer-assessment, which Topping (2009) defines as "an arrangement for learners to consider and specify the level, value or quality of a product or performance of other equal-status learners" (p. 21). When students are involved in peer-assessment, there can be developments in the effectiveness and quality of learning. Again, the observations showed that the teachers did not present students with opportunities to participate in peer-assessment. Informal interviews with the teachers suggested that peer-assessment would disrupt their teaching, as it is time-consuming and the students do not possess

the required skills. The teachers also claimed that the students would focus less on the task and spend more time talking about unrelated issues.

The findings under this theme revealed that student-to-student collaboration was evident in one classroom. The other teachers occasionally allowed the students to collaborate. However, none of the teachers actively promoted student-to-student collaboration. The findings also demonstrated that the teachers did not encourage self- and peer-assessment, because the teachers believed that the students did not possess the required skills.

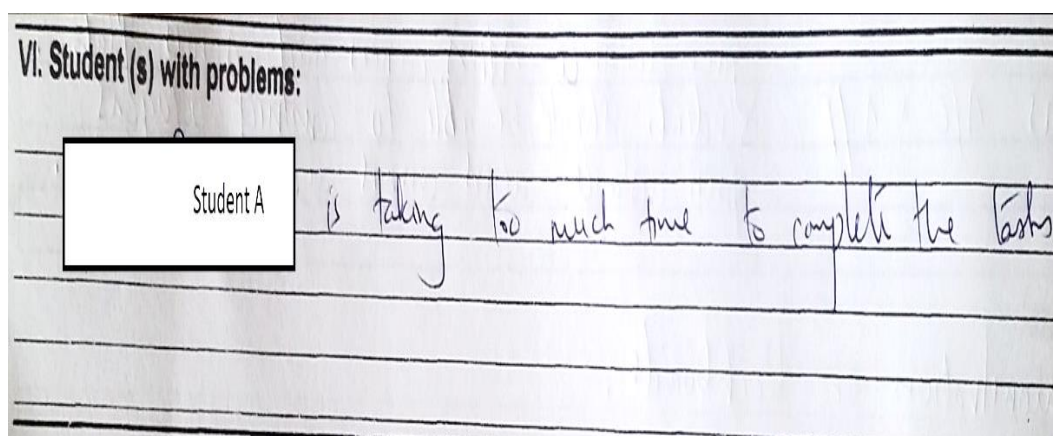
## **6.5 Teachers Reviewing and Reflecting on Assessment Information**

When implementing ‘assessment for learning’ practices, Davies (2011) recommends that teachers need to collect and record assessment information to examine students’ learning that is fundamental in planning, adjusting and transforming their practice, including ‘assessment for learning’ practices. Reflection on assessment information allows questioning and analysing one’s practice and assumptions (Burbank, Ramirez, & Bates, 2016). The findings from this section—which are presented under three sub-themes: collecting and recording evidence of students’ learning, informing practice and reflection to transform practice—were valuable to understand the rationale behind teachers’ implementation of ‘assessment for learning’ in their classrooms.

### **6.5.1 Collecting and recording evidence of students’ learning**

Collecting and recording evidence of students’ learning when implementing ‘assessment for learning’ is essential as it helps teachers adjust and transform their practice (Savage, 2015). Recording evidence of students’ learning also allows teachers to cater for remedial actions (Davies, 2011). The findings highlighted that the three teachers mainly collected evidence of students’ learning but did not record it properly. The evidence that the teachers collected during a particular lesson was used mostly during the same lesson. The teachers were not recording what learning took place and what specific difficulties students faced concerning the learning agendas or expectations. The teachers recorded superficial information concerning

students' difficulties. Thus, the teachers were not in a position to indicate the common strengths and weaknesses of the students or the specific challenges of a particular student. For example, Bronn and Renly rarely recorded any evidence in their weekly and/or daily plans, whereas Reed never recorded any such evidence. An analysis of Bronn's documents (see Figure 6.16) indicated that the 'assessment for learning' evidence recorded could hardly be used to improve learning and his practice because he did not identify the root of the students' problems.



*Figure 6.16* A sample of Bronn's remark regarding students' difficulties (SD.T3.L8.P14)

When Renly carried out 'assessment for learning', he monitored students' activities at his desk and recorded certain evidence on a monitoring sheet as shown in Figure 6.17. Renly's aim was to ensure that the students completed the set tasks successfully. Whenever he asked a student to rework a particular task, he recorded this information ('to rework') as shown in Figure 6.17. However, it is also evident from Figure 6.17 that on several occasions he did not verify students' activities (indicated by the blank spaces left). This recording technique only provided Renly with an overall understanding of the students who completed their work. The 'to rework' remark only allowed the teacher to realise that students had difficulties, but he hardly gained an indication of what specific challenges they faced, which could be used to adjust or transform his practice. Even when many students were asked to rework the same activity, Renly did not try to solve the issue by using group situations, or student-to-student collaboration, but only asked the students to rework them individually.

Homework Monitoring Sheet																
Name of Students		21.01.16	26.01.16	26.01	02.02	02.02	11.02	16.02	22.02	01.03	28.02	28.02	03.03	10.03	12.03	
		P.22	P.24	P.25	P.27	P.28	P.30	P.32	P.34	P.36	P.38	P.40	P.42	P.44	P.46	P.48
		P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15
1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		N/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		P.R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8		N/S	N/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
12		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
16		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17		done	done	done	done	done	done	done	done	done	done	done	done	done	done	done

T.R → To rework.  
 N/S → not submitted.  
 Blank → follow-up not done.

Figure 6.17 An example of Renly's planner used for recording students' activities that he verified (SD.T4.L8.P2)

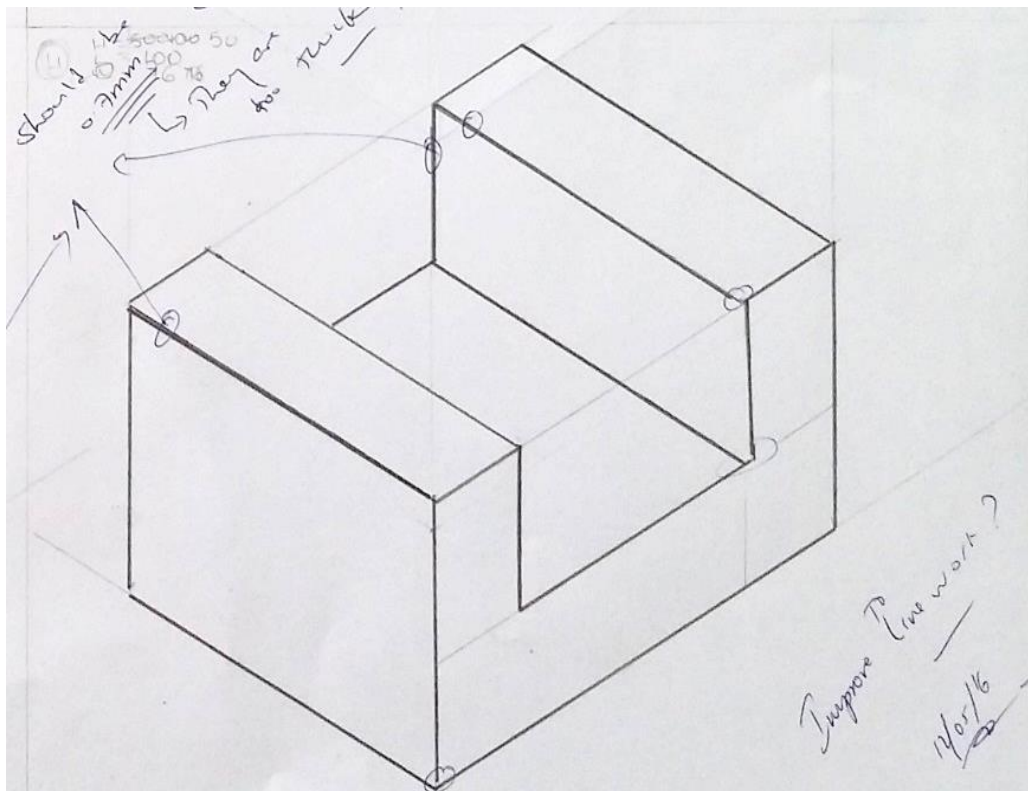
## 6.5.2 Informing practice

One of the functions of 'assessment for learning' is to guide teachers to adjust their ongoing teaching based on the collected evidence of students' achievement pertaining to the learning intentions (Fautley & Savage, 2013). The data showed that during 22 lessons (88% of the total time), all three teachers collected some evidence of students' learning that was weakly connected to the learning intentions and criteria for success. During the remaining three lessons (12%)—two lessons of Renly and one of Reed—the teachers did not collect such evidence.

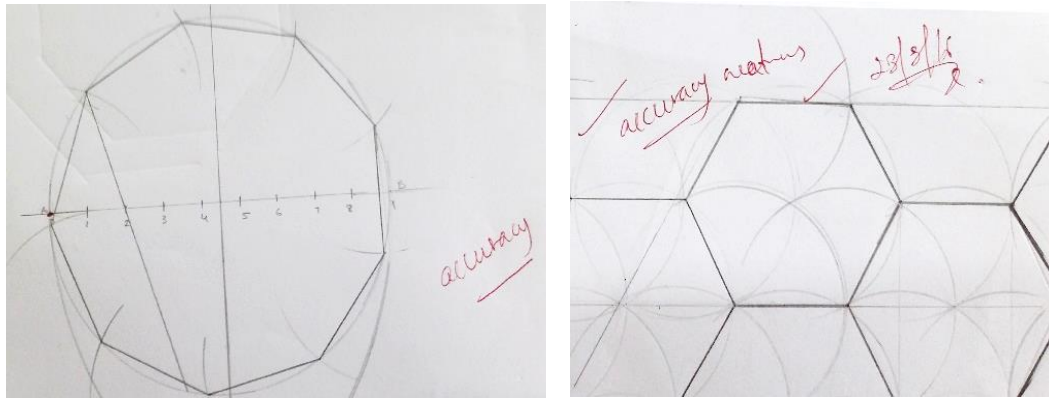
The observation findings revealed the D&T teachers analysed students' work to identify patterns of understanding and misunderstanding and made inferences about students' weaknesses, rarely elaborating on their strengths. Bronn and Reed identified such patterns and frequently re-shaped the ongoing lessons. Informal

interview findings confirmed that Bronn identified the learning activities on which students progressed satisfactorily and where they needed guidance. Bronn claimed that he focused on the learning difficulties when implementing ‘assessment for learning’ practices. Whereas Renly occasionally identified such patterns about students’ learning, but when he did, he also used the identified patterns to shape the ongoing lessons.

Nevertheless, there were learning opportunities that were neglected by all three teachers, especially when many students were able to complete the activities. Figure 6.18 is an example that shows the teacher only commented on the mistake without any further action. The teachers also ignored fundamental weaknesses that all students faced when conducting ‘assessment for learning’ (see Figure 6.19). However, the teachers made no adjustments in teaching or assessment to remedy these situations.



*Figure 6.18* An example of weaknesses identified when conducting ‘assessment for learning’ to which teachers paid little attention and did not adjust their teaching; ‘constructing of outlines and faint lines’ (SD.T4.L6.P24)



*Figure 6.19* Two examples of the same weaknesses (accuracy and neatness) identified when conducting ‘assessment for learning’ that all students struggled with, but the teachers paid little attention and did not adjust their practices to remedy the situation (SD.T3.L9.P43; SD.T3.L9.P29)

### 6.5.3 Reflection to transform practice

Reflection, considered to scaffold critical thinking, is accepted to promote teachers’ practices (Korthagen, 2004). Marcos, Sanchez, and Tillema (2011) claim that when teachers reflect on their ‘assessment for learning’ practices, they can transform their practices significantly. However, the findings from this study indicated that the D&T teachers were not reflecting effectively when monitoring assessment activities. The informal interview findings suggested that the teachers did not try to identify the causes of students’ difficulties, such as having difficulties in manipulating the drawing instruments or understanding the drawing concepts.

The evidence seems to indicate that the three D&T teachers were not performing any reflection after completing their teaching and ‘assessment for learning’ practices. Two teachers, Bronn and Renly, who were using their weekly and/or daily lesson plans, occasionally put a remark indicating whether they completed a particular lesson or which part of the lesson was unsuccessful. For example, Renly wrote in the evaluation section of his lesson plan, “ok done. Next lesson: To start explanation on ellipse” (O4.L4.P7). The informal interviews confirmed that the three teachers were not practising any reflection with the aim of transforming their own ‘assessment for learning’ or teaching practices.



The informal interviews with the three teachers on transforming their ‘assessment for learning’ practices highlighted different opinions. According to Bronn and Reed, their teaching and ‘assessment for learning’ experiences were enough for them to conduct ‘assessment for learning’ efficiently. They felt that their ‘assessment for learning’ practices did not require any transformation. They claimed that if the students do not work hard, the teacher is unable to help them in their learning. Bronn emphasised, “You witnessed, many students came without attempting or completing the activities” (I.I.T3.L11:1). However, Renly claimed that he was willing to reflect on his ‘assessment for learning’ practices and transform them, but faced several dilemmas. Renly explained that, first, not enough time was available due to school responsibilities. Second, his colleagues in the D&T department and the school may not agree to the implementation of alternative modes of assessment, and third, there is a lot of pressure to complete the syllabus and prepare students for the end-of-year examinations.

The findings under this theme revealed that the teachers collected evidence of students’ learning to improve ongoing lessons and provide immediate support to the students. However, the teachers did not record evidence of students’ learning to make long-term adjustments or transform their own practice. Two of the teachers considered that they did not need to reflect and transform their practice, while the other teacher viewed contextual factors as barriers to transform his ‘assessment for learning’ practices.

## **Summary**

This chapter presented the findings from multiple data sources, with emphasis on observations of three D&T teachers’ implementing their ‘assessment for learning’ practices at three different state secondary schools in Mauritius. The findings suggest that the teachers did not focus on clarifying and sharing the learning intentions and criteria for success, using questions to gain evidence about students’ thinking and misconceptions, fostering learner autonomy, recording assessment information and utilising the assessment evidence to transform their practice. However, the findings also revealed that the teachers presented an agenda for every

lesson when the lesson started, provided appropriate learning activities and collected ‘assessment for learning’ information to adjust their ongoing lessons.

The next chapter presents student interview findings obtained from 16 Form 3 students (involved in three group interviews). These students were from the three observed classrooms.





## CHAPTER SEVEN

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### STUDENT INTERVIEWS

This chapter reports the findings obtained from student interviews (stage three: phase two of the data collection cycle; see section 4.5.6). The purpose of this phase was to gain an understanding of students' conceptions of 'assessment for learning', which was believed to contribute in shaping teachers' 'assessment for learning' practices. Information from the student interviews enhanced understanding Design and Technology (D&T) teachers' 'assessment for learning' practices in Mauritius state secondary schools.

Three D&T teachers, who volunteered for the observations reported in Chapter Six (stage three: phase one), identified potential student participants. The selection was established by the teachers' subjective judgement of weak and strong students based on assessment performance in the classroom. Sixteen Form 3 students (14-year-olds), 12 males and four females, from three state secondary schools were interviewed in three groups—five from Rayfield school, five from Mayfield school and six from Mansfield school.

The timespan for the interviews varied between 15 and 25 minutes, depending on the amount of information the students were willing to share and the speed they responded. The three group interviews were audio-recorded, transcribed, and approved by the 16 participants. The student interviews were conducted in the Mauritian Creole language, to help students communicate freely, which I later translated into English. Since the students approved the Creole transcripts, some subjectivity could have crept into the translation, and there was no check for that from the participants. Wherever quotes (translated) from the student interview transcripts were used, an audit trail has been used. Accordingly, the code number of the group interview, specific student involved and transcript's page number where the quote appeared are displayed after each citation (see Table 11.6 of Appendix S for further details). For example, 11.S3:5 refers to a quote from

Interview 1 with Student 3 and appearing on page 5 of the transcript. Pseudonyms were used to avoid student identification.

This chapter is subdivided into four sections, and each section represents a theme informing how D&T students in Mauritius state secondary schools perceived ‘assessment for learning’. The inductive and deductive strategies were utilised to capture the themes emerging from the student group interviews, as explained in section 4.6. First, the inductive analysis similar to Chapter Five was used, and then, the deductive analysis approach was employed by following Warwick and colleagues’ (2015) ‘assessment for learning’ key strategies and the literature on students’ assessment literacy (see sections 2.1.6 & 2.1.7). These themes were generated by using Saldaña’s (2016) first and second cycle coding methods, as explained in section 4.6. Descriptive statistical analysis was performed to convey essential characteristics of the quantitative data obtained from the interviews. The descriptive statistics (mainly percentages) displayed in this chapter represent the relative viewpoints of the 16 students involved in the group interviews. The NVivo software was used to facilitate and accelerate the analysis of the interview data (see section 4.6). The four themes emerging from the student interview analyses were student views of assessment; ‘assessment for learning’; implementation of feedback; and learner autonomy.

## **7.1 Interpretations of Assessment**

The students’ understanding of assessment is likely to influence their understanding of ‘assessment for learning’ (Smith, Worsfold, Davies, Fisher, & McPhail, 2011). So, initially, the students were questioned about their understanding of the term ‘assessment’.

The 16 students had different interpretations of the term assessment. Four students (25% of all students) perceived assessment to involve checking students’ understanding, while 12 (75%) equated assessment to ‘test’. Three students (19%), out of the 12, added that assessment included examinations. However, one student, Dev, argued that assessment “is not an examination”, but a test, to know if “the students have a good standard ... to compete for the examination” (I1.S2:1). Several

students stated that their teacher conducted assessments with the aim of familiarising them with examinations. For example, Anthony explained, “It is to give students ideas of what to expect for the examination” (I1.S3:1).

The results showed that several students were frustrated with the idea of assessment. Five students (from Mansfield) spoke of anxiety due to assessment (tests) and revealed that they were always worried about their performance. Sam added that the teacher frequently conducted tests throughout the year. He suggested, “Instead of having three tests in one subject, it would be better to have one examination” (I2.S2:5). Sam further explained the reason for his frustration, claiming, “in each subject, we have three tests, when we combine all, it makes a lot” (I2.S2:5). Students also associated assessment with marks.

The findings highlighted that several students regarded assessment as a method used to check their understanding of the concepts taught in class. The students could identify several assessment methods, such as practical work, projects and quizzes. However, initial reactions of 12 students (75%) towards assessment methods were ‘tests’ and ‘examinations’. Overall, 10 students (63%) considered that the various assessment methods, in one way or another, contributed to their learning.

The findings under this theme revealed that although the students had various interpretations of the term assessment, they understood that one of the primary purposes was to improve students’ learning. The students were aware of a variety of assessment methods and were frustrated with the frequent use of the testing method. However, they accepted a narrow range of assessment methods.

## **7.2 Opinions on ‘Assessment for Learning’**

The meaning of ‘assessment for learning’ was first briefly explained to the students. The findings from this theme revealed students’ beliefs about the contribution of ‘assessment for learning’ towards their learning. It was assumed these beliefs and students’ expectations from ‘assessment for learning’ could shape their teacher’s ‘assessment for learning’ practices.

The students considered ‘assessment for learning’ to have several purposes. Twelve students (75%) reported that one of its purposes was to verify if the students have understood the teacher’s explanations. Four students from Mansfield school also indicated that their teacher used ‘assessment for learning’ to know if they were doing well. One student explained that for the teacher to know if the students were learning satisfactorily, he would not rely on one lesson but a series of lessons. Another student, Sheila, added that when the teacher implements ‘assessment for learning’, he would know “if we are revising” (I2.S3:1) previous lessons.

Ten students (63%) from all three schools were confident that one of the fundamental roles of ‘assessment for learning’ was to identify students’ learning difficulties. These students commented that after their challenges were identified, they corrected their mistakes and attempted to do better in the future. When faced with additional problems, the students explained that they sought help from their respective teacher. Chris added that if many students were having difficulties, then the teacher would re-explain the concept(s).

Six students (38%) linked ‘assessment for learning’ practices with marks. The students noted that another purpose of ‘assessment for learning’ was to generate marks that were entered into their report books to calculate their end-of-term achievements. Daniel elaborated that ‘assessment for learning’ involved marks that were added to indicate the students’ end-of-term performances. Mike stated that the function of ‘assessment for learning’ was also “to identify his rank in the class” (I3.S1:1). Johnny expressed that when marks were allocated continuously during all three terms, it put him under much pressure, and Dev stressed that “when there are no marks, you can concentrate and deliver better” (I1.S2:6).

One student associated ‘assessment for learning’ with teaching improvement. Daniel, whose mother is a secondary school principal, emphasised that ‘assessment for learning’ could be used “to improve ... teaching” (I1.S5:1). Daniel indicated that when teachers recognise shortcomings in students’ learning through ‘assessment for learning’, they might have to adapt their teaching.

The students highlighted that another purpose of ‘assessment for learning’ was to prepare them for examinations. Three students from Rayfield school explained that the ‘assessment for learning’ questions, set by their teacher, closely resembled examination questions. Thus, they considered ‘assessment for learning’ as a means to indicate to them “what to expect for the examination” (I1.S3:1).

Even if most students understood that the primary purpose of ‘assessment for learning’ was to help them learn, they had conflicting views when asked if the teacher gave different ‘assessment for learning’ activities to different groups of students. The students commented that the same activities should be provided to everyone and stressed that it would be unfair if different activities were arranged for different groups in the same classroom. Anthony stated, “We all follow the same explanation, so it is not reasonable for some students to have easier work” (I1.S3:2). Four students, who again associated ‘assessment for learning’ tasks with marks, claimed that they would be penalised if others were handed simpler activities, and they would feel inferior because they would obtain lower marks. Sam pointed out that “the teacher will have difficulties to correct two different tasks” (I2.S2:2). However, Anthony reflected as follows: “But, if the teacher sees that a student was having difficulties to follow the lesson, he can give him easier work to know his level” (I1.S3:2-3).

The findings under this theme revealed that the students understood the purposes of ‘assessment for learning’ relatively well. The students explained that the purposes of ‘assessment for learning’ were to verify students’ understandings, identify their difficulties, enhance their learning and improve their teacher’s practices. However, the students also claimed that one purpose of ‘assessment for learning’ was also to generate end-of-term marks and prepare them for examinations, which shows that the students were encultured to the existing ‘assessment for learning’ practices that focused on tests and examinations.

### **7.3 Students' Opinions on, and Implementation of, Feedback**

This theme presents the students' opinions regarding teachers' and peers' feedback. The section also elaborates on how the students used their teacher's feedback. The findings in this section were helpful to understand students' conceptions of 'assessment for learning', which could influence the D&T teachers' 'assessment for learning' practices.

Most students viewed feedback as a form of guidance from the teacher. The students believed that the teacher's advice should be followed to improve their tasks and perform well in tests and examinations. All the students agreed that one of the teacher's roles was to identify their learning difficulties. The students perceived that once their mistakes were identified, their teacher needed to explain the appropriate approaches for completing the tasks, which would be helpful for examination success.

The students asserted that their teacher's feedback was also required to avoid repetition of mistakes. All the students stated that once their teacher identified their errors from allocated tasks, and provided guidance, they were expected to correct those missteps and ensure that they were not repeated in the future. Four students (25%) claimed that their teacher's feedback also allowed them to learn from those mistakes and do better in the future. However, six students (38%) said that feedback was provided to avoid similar errors in tests and examinations.

Most students stated that after receiving their teacher's feedback, they followed their explanations, often to the letter, to correct the activities. Several students added that they practised the tasks and tried to avoid the identified mistakes, and in case they faced difficulties, they would request further support from their teacher. Jane stated, "If the task is not correct, then I would reattempt until it is correct ... and then ask the teacher to comment" (I2.S6:5).

When students received their teacher's feedback, they could assist their friends in their learning. Two students (13%) declared that they were highly motivated when

their tasks were done correctly. Accordingly, they could support their friends, who were having difficulties in completing the tasks. Sam added that when he received useful feedback on his classwork and homework, he knew he would do well in the end-of-term tests.

The students also appreciated peer feedback. They stressed that they felt more at ease with peer feedback because they could discuss and question their peers spontaneously and more freely than they could with their teacher. Moreover, they did not feel embarrassed in phrasing their questions (asking unintelligent questions) and could use simple language. Students claimed that peer feedback is timely, even if not always helpful. When their peers are unable to help, there is also a sense of relief knowing that they are not the only one facing difficulties.

The students mentioned using a variety of strategies to respond to their teacher's feedback. Most students (12 students, 75%) claimed that if they had further difficulties or could not understand their teacher's comments, they would return to them for further guidance. The remaining 25% of students indicated that they requested assistance from their parents, friends and cousins. David explained, "I show the feedback to my parents, and they tell me what to do and what not to do" (I2.S4:5).

The findings under this theme revealed that students valued both their teacher's and peers' feedback. The students appreciated feedback as it helped them improve their learning and perform better in examinations. The students also claimed to use the teacher's feedback to assist their peers in their learning.

## **7.4 Views on Learner Autonomy**

Learner autonomy is about allowing learners to take responsibility for their learning (Fauziati, 2007) by assessing their own and peers' tasks and working collaboratively. The findings under this theme revealed students' viewpoints on learner autonomy, which was beneficial to comprehend the D&T teachers' 'assessment for learning' practices.



When asked about student-to-student collaboration, findings suggested that the students from the different schools collaborated differently, based on the level of autonomy given to them. The students mainly explained how they collaborated for classwork, homework, and preparing for tests and examinations.

Several students appreciated having the freedom to move around the classroom and converse with their peers. Students at Rayfield said that their D&T teacher was easy-going, but he did not like them being noisy when they collaborated. However, the students at Mansfield and Mayfield stated that they were prohibited from moving around the classroom and could rarely discuss their difficulties with their classmates.

Students at Rayfield reported how they worked with their peers when the teacher gave classwork. When someone had learning difficulties, he would approach his peers who understood how the task had to be performed. The students also acknowledged that once they completed their work, they would move around the classroom and help others.

The students at Mansfield cooperated differently regarding classwork and homework. These students mentioned that they rarely worked together during the D&T lessons. However, they collaborated on specific homework activities, as well as when they prepared for tests and examinations, but only outside D&T classes.

The students at Mayfield claimed that they could occasionally collaborate with their peers in the classroom, and they frequently acted as a team regarding homework, and preparing for tests and examinations. During the D&T classes, when having difficulties, the students either helped each other or asked for their teacher's guidance. Outside the D&T classes, the students disclosed teaming up with friends (including those from other Form 3 classes). At home, the students contacted their friends via text messages and group chats. The students felt more at ease when they collaborated with their peers.

During the interview, the students also shared their views on the benefits and limitations of collaborating with peers. The students argued that they do well when

they worked with their peers and agreed that collaboration helped them to understand the concepts better and complete the activities faster. Several students added that they were able to identify their weaknesses when they collaborated with their peers. The students at Rayfield explained that when assisting their friends during class activities, they might notice or receive peer feedback, indicating that they had misinterpreted something or had made mistakes, and they would immediately sort out their misunderstandings. However, Sam stressed that collaboration has drawbacks as well, “You might ask a friend to clarify something on the eve of a test, possibly he does not know, and he wrongly explains the concepts. So, you might not do well in the test” (I2.S2:4).

When questioned about self-assessment, the students shared different viewpoints. Thirteen students (81%) claimed to do self-assessment, while two students (13%) mentioned doing it only rarely, and the remaining student did not practise it at all. For Daniel, who used self-assessment rarely, it meant judging himself. He explained, “Let us say when I am drawing a projection, I have difficulties in visualising it, then automatically I tell myself that I am not good enough to complete the task. Then, I ask someone” (I1.S5:4).

The 13 students who claimed to use self-assessment had different interpretations of the approach. For three students (19%) self-assessment meant to practise past examination papers, while the rest (10 students or 63%) associated it with the activities that facilitated their learning. Six (38%) out of the 10 students thought that self-assessment represented doing their classwork and homework, two participants (13%) indicated reattempting activities that they could not do on their own, and the remaining two stated that it was about striving to complete additional activities that they identified themselves. As Johnny explained, “I look for similar tasks and some which are more difficult, and I try these out” (I1.S5:5).

Several students also discussed the strengths and weaknesses of self-assessment, believing that self-assessment is beneficial as it allows them to gauge their potential. Daniel stressed, “Self-assessment is useful because for the examination we are on our own. So it is better to be self-dependent” (I1.S5:5). Chris stated that self-assessment increased his confidence, which was helpful before participating in tests

and examinations. The students also expressed their concerns regarding self-assessment. For example, Brian emphasised that they might make mistakes, which they were unaware of, and as a result, may repeat those errors in future tasks.

The interview findings revealed that the students were not involved in peer-assessment. Most students were hesitant to respond because they seemed not to be aware of what peer-assessment involved, but some believed that because they would be engaging with their peers, they would learn more efficiently.

The findings under this theme revealed that the students were not familiar with self- and peer-assessment strategies, but they collaborated in their learning. Several students collaborated when the D&T teachers set classroom activities and those, who were unable to collaborate in class, because of their teacher's directions, teamed-up during their free time as they recognised that collaboration improved their learning.

## **Summary**

This chapter presented the findings from three group interviews involving 16 students (14-year-olds) in three state secondary schools in Mauritius. The results demonstrated that the students considered 'assessment for learning' to have several roles, such as identifying their mistakes, improving learning and teaching, and preparing them for tests and examinations. The results also indicated that the students relied on both their peers' and teacher's feedback. The findings revealed that students were not involved in peer-assessment, knew little about self-assessment and valued collaborating with peers. The findings also suggested that the students accepted a narrow range of assessment methods and were encultured to the existing 'assessment for learning' practices, which focused on tests and examinations, rather than assessment designed to promote learner autonomy.

The next chapter synthesises the research findings described in Chapters Four (teacher interviews), Five (teachers' practices in the classroom) and Six (student interviews) corresponding to the extant literature presented in Chapters Two and Three. First, the four sub-research questions are addressed and then the overarching

research question is answered: How are the ‘assessment for learning’ practices of Mauritius D&T teachers framed?



# CHAPTER EIGHT

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## DISCUSSION

‘Assessment for learning’ is considered an intricate, nuanced and dynamic concept due to changes in curriculum and individuals’ conceptions (S. Brown & Race, 2013; St. George & Bourke, 2008). First, the curriculum that guides, shapes and influences teachers’ practices is changing, and this reflects current theorising and research about how students learn. Second, the world is changing in response to changes in technologies, family structures, communities and countries. Hence investigating teachers’ assessment practices is not an easy process. However, in this study, it was possible to gain insights into Design and Technology (D&T) teachers’ ‘assessment for learning’ practices by adopting an interpretive paradigm and ethnographic methodology. This approach encapsulated several teachers’ perspectives on ‘assessment for learning’, as well as examining in greater depth three teachers’ ‘assessment for learning’ practices in three state secondary school settings in Mauritius. Multiple data collection sources, such as interviews, document analysis, observations and questionnaires, were used to answer the research questions of this study.

The following research question guided this study:

- How are the ‘assessment for learning’ practices of Mauritius Design and Technology teachers framed?

The sub-questions arising from the main question were:

- What are the teachers’ ‘assessment for learning’ practices?
- What guidelines are the teachers using for their ‘assessment for learning’ practices?
- What are the teachers’ rationales for implementing ‘assessment for learning’?
- What are the students’ conceptions of ‘assessment for learning’?

To answer these questions, a three-stage mixed methods research design was adopted that involved D&T teachers and students from state secondary schools in

Mauritius. The first stage entailed 29 teachers from 11 schools completing a questionnaire. The second stage involved the same teachers in an interview (group or individual) that was conducted in their respective schools. The third stage encompassed two phases—a teacher phase and a student phase. The teacher phase involved three teachers with different levels of experience who were observed for 8–10 lessons. Other sources of data, such as field notes, informal teacher interviews, teaching plans and student progress records, were also collected. The student phase involved 16 students from the three observed classrooms, who were interviewed in groups.

This chapter synthesises the research findings described in Chapters Five, Six and Seven in relation to the literature presented in Chapter Two. This chapter aims to answer the research questions posed corresponding to D&T teachers’ ‘assessment for learning’ practices in the state secondary schools in Mauritius.

This chapter is divided into five sections. The first four sections discuss the key findings which answer the sub-questions arising from the main question. Each section consists of a brief description, explanations, interpretations and exemplifications of the results, and discussions on the links between these findings and published research to answer one sub-question. The themes of the first three sections were developed during an analysis of the key ideas from Chapters Five and Six based on their significance in answering each sub-research questions. However, the themes of the fourth section were established based on the fundamental ideas presented in chronological order in Chapter Seven. The fifth section provides an overall summary of the results, which answers the overarching research question.

The next section will answer the first sub-research question: What are the teachers’ ‘assessment for learning’ practices? Five themes were identified under the section, which highlight the D&T teachers’ ‘assessment for learning’ practices in Mauritius state secondary schools—clarifying and sharing intentions and criteria, supporting classroom discussions, feedback to students, activating learner autonomy, and improving their practice.

## **8.1 D&T Teachers' 'Assessment for Learning' Practices**

Research and practice have shown that 'assessment for learning' is not "a one way fits all" practice, but is a differentiated practice, which depends on students' needs, learning intentions, students' strengths and weaknesses, and situational factors (McMillan, 2010, p. 48). For teachers to develop their 'assessment for learning' practices in a sociocultural context, they need to continuously adapt their assessment practices, which includes allowing students to adopt new roles that will ultimately direct them to take responsibility for their own learning (Hayward, 2011).

### **8.1.1 Clarifying and sharing intentions and criteria**

There is a large volume of published studies suggesting that clarifying and sharing learning intentions and success criteria form part of effective 'assessment for learning' strategies (Black & Wiliam, 2009; Compton & Harwood, 2003; Crichton & McDaid, 2016). From the interview findings, it appears that many teachers had a clear understanding of the purpose of learning intentions. Twenty teachers (69%) claimed to communicate the learning intentions at the beginning of the lessons, from which one-quarter also mentioned sharing the learning intentions during lessons. However, the classroom observations indicated that instead of clarifying and sharing the learning intentions at the beginning of, or during, each lesson, teachers only mentioned what content would be taught. In D&T, the learning intentions are often grouped into conceptual, technical, procedural and societal categories (Fleer & Jane, 2011; Moreland et al., 2008). It is through these learning intentions that teachers determine how students will make progress towards technological goals (Fox-Turnbull, 2015). The purpose of learning intentions, as highlighted by Crichton and McDaid (2016), is to inform students about each lesson's intended outcomes with regard to their learning. However, in this study, the teachers did not categorise the learning intentions, and it appeared that many D&T teachers were using the learning intentions to convey the content to be taught instead of what students were expected to learn during each lesson. Similarly, in Moreland and Jones' (2000) study, which involved nine primary school technology teachers from two New Zealand schools, teachers focused on tasks rather than learning intentions. Nemec and Bussema (2010) claim that many teachers have this misunderstanding of the purpose of learning intentions.



The teacher interviews suggest that 14% of the teachers shared the learning intentions only when the tasks were corrected. Another group (17%) did not communicate the learning intentions for each lesson but shared them at the beginning of the term or topic. The findings of this study show that many D&T teachers were unfamiliar with the purpose of learning intentions. Sharing the learning intentions does not mean merely telling students what the targets are or writing them on the board, but as Moss and Brookhart (2009) put it, learners should also comprehend what those targets mean. Nevertheless, from the classroom observations, it was evident that the D&T teachers rarely explained the learning intentions to the students. Seminal work done by Moreland and Jones (2000) suggests that when teachers struggle or do not identify the different categories of technological learning intentions, they focus on task completion rather than enhancing students' learning. This approach of not identifying technological learning intentions was common in this study and indicates that the teachers were not competent or confident in this aspect of assessment.

During interviews, only one teacher, Joffrey, stated that the learning intentions should be written for students at the start of the lesson. Joffrey's view seems to be consistent with the literature (Leahy, Lyon, Thompson, & Wiliam, 2005; Moss & Brookhart, 2009), but is in stark contrast to the views of other teachers. Leahy and colleagues (2005) claim that many teachers write the learning intentions, but these are rarely displayed in student-friendly language. However, there seems to be an assumption that when learning intentions are written, it is enough for the students to understand the targets. Moss and Brookhart (2009) argue that one common misconception that teachers have is that it is sufficient to tell the students or write the intentions on the board. It appears this misconception originates from the belief that mentioning or writing the intentions would trigger students to memorise and understand them.

The observations of classroom practice indicated that teachers planned and composed the learning intentions inefficiently. The literature in D&T suggests that learning intentions need to be explicitly linked with technological practice and literacy (Compton, 2009), and the observations showed this was not common

practice in these classrooms. Compton and Harwood (2003) explain that learning intentions in D&T typically reflect two types—predetermined and negotiated. Predetermined learning intentions are planned before teaching, and are based on teachers’ understanding of students’ needs, technological practice to be undertaken based on the requirement of the curriculum and facilities available to the teacher. To ensure that students progress, Compton and Harwood (2003) and Moreland et al. (2008) argue that learning intentions may require realignment (during lessons) in response to students’ needs and interests with regard to technological practice that students propose to adopt. This is the reason behind Crichton and McDaid (2016) anticipating teachers need to discuss and negotiate learning intentions with learners for clarity of purpose. In this study, from the classroom observations, there was limited evidence of teachers negotiating or realigning learning intentions.

The classroom practices revealed that only one out of the three teachers, Renly, was planning the learning intentions before the lesson. However, an analysis of Renly’s documents showed that his learning intentions were written in a language only appropriate for the teacher, rather than being written for students. According to Dean (2013), there are many examples of implicit learning intentions of teachers, which he considers as “not learning intentions at all” (p. 39). As Dymoke and Harrison (2008) point out, what teachers seem to be doing is developing teaching intentions (what they would teach) rather than learning intentions (what students would learn). Arguably, with implicit learning intentions, teachers would barely have an understanding of students’ common steps and missteps towards those intentions. Moss and Brookhart argue that clear and specific intentions are fundamental for teachers to obtain evidence of where students are in their journey towards mastering the set objectives (Moss & Brookhart, 2009).

According to Crichton and McDaid (2016), the criteria for success, which are linked to learning intentions, allow students to know “how they will recognise if they have been successful” (p. 193). The interviews indicated that the D&T teachers did not provide success criteria to help students recognise the progress in their learning, but to ensure that the students obtained correct answers. Arguably, the teachers could have identified what the students would be doing to demonstrate they achieved the technological learning intentions (Moreland et al., 2007). Instead, almost 31% of

the teachers appeared to relate success criteria to marks assigned to activities. A possible interpretation is that either the teachers were not familiar with what success criteria meant or they were not aware of their importance. Teachers' judgements of student outcomes and achievement could be doubted if they were unfamiliar with the purpose and importance of success criteria (Dompnier et al., 2006; Kaiser et al., 2013).

Hartell and Inga-Britt (2014) emphasise that when teachers clarify and share success criteria, all students gain, although low performers gain more. The interviews revealed that only one teacher (3% of the 29 interviewed) explained the 'assessment for learning' criteria to the students. However, this teacher claimed to provide success criteria only to students who were unsuccessful in completing the activities. This finding suggests that the teachers did not value sharing criteria with all students or were not aware of the importance of doing so.

Despite these findings, the observed classroom practices highlighted that the teachers occasionally shared the success criteria with students, and when they did these were expressed in a language that was accessible to the learners. According to Read and Hurford (2010), teachers need to facilitate students to use success criteria to identify the next steps in their learning. When the teachers in this study clarified the success criteria, it was evident that they could scaffold students' learning more effectively. There were signs of a shift from task completion to a focus on students' learning. However, the success criteria shared were not always presented in an orderly way and were often incomplete because the teachers did not plan them nor followed any 'assessment for learning' guidelines. The Assessment Reform Group (2002) notes that teachers' planning should not only consist of planned success criteria but include strategies of how students would understand them. From the observations of this study, the teachers did not seem to have a particular strategy to help students understand the criteria. Similar to the learning intentions, Crichton and McDaid (2016) suggest that students should be involved in discussions corresponding to success criteria, which was not apparent from classroom observations. It appears that the pressure of syllabus objectives coverage and preparation of students for the end-of-year examinations deterred teachers from

proving success criteria systematically, and assisting and enabling students to use success criteria.

### **8.1.2 Supporting discussions**

Questioning serves a range of purposes; therefore, it is essential for teachers to construct their questions deliberately (Brookfield & Preskill, 2005). Moss and Brookhart (2009) argue that “good questions are rarely asked without purposeful planning” and “the power of strategic questioning in [‘assessment for learning’] comes from tightly linking questions to the learning targets” (p. 103). However, in this study, the observations suggest that the teachers did not employ effective questioning planning skills. The teachers also did not seem to relate questions to the learning intentions that would allow them to gain evidence of students’ learning.

A key feature of questioning is that they are asked at the appropriate time (Dalton-Puffer, 2006; Gregory, 2016; Moss & Brookhart, 2009). The observation findings highlighted that only one of the three teachers (the most experienced one) asked several questions at the appropriate time to check students’ prior knowledge and identify misconceptions. According to Gregory (2016), and Moss and Brookhart (2009), another key feature of questioning is allowing appropriate wait time (minimum of 5–7 seconds) for students to respond and take responsibility for their learning. The observations showed that two of the teachers provided the appropriate wait time for the learners to answer questions, while the third teacher did not allow enough time for students to respond. These results indicate that the D&T teachers might have an understanding of asking questions at the appropriate time and providing appropriate wait time. However, they were not effectively applying these skills in their ‘assessment for learning’ practices.

During the interviews, the teachers claimed to use a variety of assessment methods, such as oral questioning, practical work and discussion, for their ‘assessment for learning’ practices. Research confirms that it is essential for teachers to utilise a variety of assessment techniques to uncover students’ understanding and misconceptions (Jimaa, 2011). The teachers in this study stated they set drawing practical activities at all levels. Nevertheless, they claimed to organise designing and making practical activities for upper secondary students preparing for the

international examinations, while for lower secondary classes only paper products were recommended. This finding shows that students were exposed to the practical sides (designing and making) of D&T only when the formal summative assessment was approaching. The classroom practices also showed that teachers used a narrow range of ‘assessment for learning’ methods which were not in line with the *National Curriculum Framework: Secondary* (NCFS) (MOEHR, 2009). Butt (2008) claims that assessment, which is essential for teaching and learning, is somewhat neglected at the planning stage. Butt adds that if teachers do not plan their ‘assessment for learning’ practices, students’ learning would certainly be affected.

The observations also revealed that the D&T teachers missed critical opportunities to make inferences about students’ progress through discussions and questions regarding the intended goals when tasks were set. Research suggests that discussion encourages students to become active participants in the classroom and motivates them to learn beyond the classroom (Brookfield & Preskill, 2005; Sant-Obiols, 2014). However, research also indicates that despite the abundance of benefits of classroom discussion (Dallimore, Hertenstein, & Platt, 2004), it is not utilised efficiently by teachers. In this study, instead of adopting a constructivist framework, the teachers used conventional approaches to assessment where students worked individually and discussion was not favoured. Some studies suggest that a potential contributor to didactic approaches is the high number of students in the class, which causes teachers to struggle to maintain discipline (McCain, Cox, Paulus, Luke, & Abadzi, 1985; L. Weiner, 2003). Other research suggests that the effects of educational experiences, such as resources, space, teacher workload and teachers’ expertise (Pedder, 2006), may be the reasons for avoiding discursive practice. In this research, both the educational experiences and number of students in the classrooms seem to be the reason leading teachers to avoid discursive teaching practice, as well as to have a firm focus on ensuring they covered the content in a timely fashion in preparation for end-of-year tests and examinations.

Willis and Adie (2014) claim that it is through teacher-student conversations that learners become experts in their own learning. Moreland et al. (2008) add that classroom talk should be rich to enable students to reveal their technological concerns and ideas. However, the observations indicated that the D&T teachers

rarely encouraged their students to interact, either during explanation or when providing feedback. The teachers' questions were rarely targeted. Thus, students who knew the answer responded voluntarily, and often many responded together. The outcomes might be due to lack of teachers' questioning skills. Another possible explanation is provided by Brophy and Good (1974), who argue that teachers also treat their students differently according to their expectations of pupils' academic achievement. This was evident in some observed classroom practices where the D&T teachers only interacted with students they perceived to be high achievers.

### **8.1.3 Feedback to students**

According to Brookhart (2011b), feedback is useful only if it benefits students in their learning. Hence, for feedback to serve its primary purpose, students should understand it and be able to apply it. However, teachers first need to help students recognise their level of knowledge, which can be achieved through the learning intentions and success criteria, and second, support them to close the gap between their actual and the desired level (Bruno & Santos, 2010). From the teacher interviews and observations of classroom practice, it did not seem that teachers were not providing explicit success criteria nor supporting their students in closing the gap between the actual and desired level. Instead, it appears that the main reason teachers' provided feedback was to signal students' potential errors or correct their tasks and provide marks. Brookhart (2011b) underlines that feedback is not only about highlighting incorrect answers and providing correct solutions to students. The reliability of the assessment marks could be questioned, especially when teachers did not use detailed specification of criteria (Harlen, 2005b).

Brookhart (2011b) warns that useful feedback focuses on several strengths and at least one suggestion for the following step. She adds that it is vital for teachers to underline students' strengths, mainly corresponding to the learning targets, because learners may not recognise them. The classroom practices observed in this study indicated that the teachers' feedback often focused on students' weaknesses and rarely on their strengths. This suggests that the D&T teachers lacked understanding of the purpose of feedback.

The findings revealed that the teachers also gave written feedback in the form of comments, freehand sketches and demonstrations. Several studies indicate that feedback in the form of comments can assist students to identify their strengths and weaknesses, and encourage them to reflect on their learning (Gipps, 1999; Stracke & Kumar, 2010). However, Bruno and Santos (2010) emphasise that if feedback is “not well thought [through], structured and adequately integrated” (p. 111) into the students’ learning processes, it is not going to support students’ learning. The observations in the current study show that teachers’ feedback was insufficiently explained. Thus, it can be argued that such teachers’ feedback would hardly benefit students’ learning. For example, in one session a teacher wrote some technical terms associated with graphical drawings, while another wrote marks only. Three teachers (10%) interviewed acknowledged that their written feedback was in the form of marks rather than comments, and this finding is in contrast to what research advocates as best practice in assessment.

The literature highlights that feedback received during a learning process can assist students in reflecting on their learning (Jian-Wei Lin, Yuan-Cheng Lai, & Yuh-Shy Chuang, 2013). But in this study, it appears that the teachers rarely acted as mediators to provide such feedback. Observations also revealed that the D&T teachers occasionally built on students’ responses and only rarely turned the feedback into conversations to provoke students to think critically.

Jonassen (1997) claims that when students perform complex tasks, scaffolds are required to support them in their zone of proximal development. Eventually, teachers need to step back and provide support as required, and these scaffolds should disappear with time as learners are encouraged to reflect (Coltman, Petyaeva, & Anghileri, 2002). The observations from this study showed that the teachers provided students with scaffolds but were rarely stepping back to allow students to think.

Evidence emerging from the literature (Fox-Turnbull, 2010, 2015; N. Mercer & Dawes, 2008) suggests that teachers can significantly improve students’ learning in D&T if they understand the benefits of classroom conversation and facilitate its use when providing feedback. Surprisingly, the observations gathered in this study

revealed that the D&T teachers were not involved in a lot of verbal exchanges, but mostly told students what to do, and when they were engaged in dialogues, these were short and often ended abruptly. Brookhart (2011b) stresses that teachers' feedback "should not sound like giving orders" (p. 34), which implies that students should be actively involved thereby giving indications to the teacher about whether the feedback provided was clear, specific and useful.

Brookhart (2011b) claims that for feedback to be effective, it should be timely. She adds that feedback on students' works should be provided while learners still remember the task and reason for doing it. It can be argued that in this study the observed teachers gave timely feedback on ongoing tasks. However, one unanticipated finding was that they delayed their feedback on completed tasks, while two teachers provided no feedback at all to some students. According to Bruno and Santos (2010), timely feedback is better for students' learning, especially in D&T which involves a design process and drawings, as mistakes made in one step could be transferred to other steps, thus undermining the whole process or activity.

Similarly, Corbalan, Paas, and Cuypers (2010) stress that timely feedback that indicates learning progress helps to motivate students. The teacher interviews indicate that 17% of teachers provided feedback to motivate their students. These results were consistent with the observed classroom practices, suggesting that the teachers rarely and ineffectively used feedback strategies to boost learners' motivation and confidence in their learning. The classroom practices also demonstrated that the D&T teachers mostly motivated bright students and often passed comments that could vex and discourage low achievers. One possible explanation of D&T teachers' passive attitude towards students' motivation could be associated with their sense of self-efficacy as a teacher. Thoonen et al. (2011) claim that teachers' sense of self-efficacy contributes towards their beliefs in their own ability to affect students' motivation and learning.

#### **8.1.4 Activating learner autonomy**

Pedder and James (2011) suggest that where 'assessment for learning' is authentically and successfully promoted, teachers and students are accountable to



themselves. To fulfil the potential of ‘assessment for learning’, every member involved needs to take collective responsibility for their actions and choices. It is this interactive nature of ‘assessment for learning’ strategies that provide ‘assessment for learning’ with a social character (Pedder & James, 2011). In this study, the interactive nature of ‘assessment for learning’ was associated with student collaboration, self-assessment and peer-assessment.

Recent writing indicates that collaboration is based on the principle that students naturally become actively involved in, and responsible for their learning, by interacting with their peers, with the aim of solving problems jointly (McDonough & Foote, 2015; Wolfe, 2012). Collaborative learning offers students opportunities to ask questions, clarify their reasoning and reflect on their learning (Gommans, Serger, Burk, & Scholte, 2015). The interviews show that 38% of the teachers reported allowing students to collaborate when enacting ‘assessment for learning’. However, these teachers’ claimed to use student collaboration to facilitate their teaching rather than improve students’ learning. There are several possible reasons for teachers adopting such behaviour, for example, weak collaboration skills, their own beliefs, others’ beliefs (principal, student, parent), lack of teacher education regarding student collaboration and/or the complex context of schools (Bondy & Brownell, 1997). These might be possible reasons that influenced the D&T teachers’ approaches to collaboration. For example, Wolfe (2012) claims that due to lack of education in collaboration, teachers often implement new learning methods based on trial and error, rather than evidentially-based pedagogies.

The observed classroom practices in this study showed that none of the three teachers promoted student collaboration. Nevertheless, there was evidence of student-to-student partnerships when tasks were assigned to students, mainly in Reed’s classroom. Mehrotra, Khunyakari, Natarajan, and Chunawala (2007) suggest that collaboration influences the quality of students’ learning and outcomes. There was evidence of students’ learning in Reed’s classroom. When students collaborate, according to Thoonen et al. (2011), it is students’ intrinsic motivation and interaction that inspire and facilitate their efforts. Students’ desire to learn while interacting with their peers was evident in both Reed’s and Renly’s classrooms, a finding which confirms previous research.

The observations of teachers' 'assessment for learning' practices also showed that teacher-centred approaches dominated teaching, learning and assessment. However, Crichton and McDaid (2016) claim that the learning culture of an 'assessment for learning' classroom should reflect a social-constructivist perspective where each learner is guided by a more knowledgeable 'other' (teacher or peer), suggesting that teachers in this study were not primarily drawing on sociocultural theory in their teaching. Several factors could prevent teachers from allowing students to collaborate, such as noise due to student interactions, the pressure to complete the syllabus or difficulty managing students (Sant-Obiols, 2014). These issues were raised by the teachers in this study. Bolton (1999) further argues that merely allowing students to work as a team, or assigning team projects, is not enough in assisting students to acquire collaborative skills. Instead, teachers must be active facilitators of team learning (Fredrick, 2008), which was not evident in this study.

Bullock (2011) proposes that self-assessment is critical for fostering self-awareness; thus, when efficiently implemented in the classroom, it allows students to set realistic targets and manage their own learning. Little (2005) adds that within a learner-centred ideology, the underlying belief is that teachers cannot teach students everything they should know and that learning also takes place outside the classroom. However, in this study, the teachers did not seem to adopt a learner-centred ideology. Also, it appears they were attempting to teach everything they believed students should know. A study by Wiliam (2011a) showed that self-assessment almost doubled the rate at which students were learning. Therefore, it makes sense that learners should be involved in 'assessment for learning' processes, including goal setting, task selection and self-assessment, so the findings that teachers were not involving students in their own assessment are of concern.

Even though the NCFS (MOEHR, 2009) recommends a learner-centred approach to assessment, one unanticipated finding from the teacher interviews was that only one teacher claimed to promote self-assessment. However, this teacher underlined that he would support students to self-assess their work only if the students asked him to guide them. The interviews suggest that the initiative to encourage students to use self-assessment to improve their learning did not come from the teachers,

when ideally teachers should be supporting students and mediating the required skills (Applefield et al., 2000). This result parallels Griffin, Casagan, Care, Vista, and Nava's research (2016), which investigated teachers' formative assessment practices in the Philippines after the implementation of a new curriculum in 2012. According to Griffin et al. (2016), rather than adopting educational reform, and focusing on formative assessment and learner autonomy, the teachers in the Philippines maintained the status quo and prepared students for examinations.

The observation findings of this study were consistent with the interview results, which revealed that the D&T teachers did not offer their students opportunities to engage in self-assessment. In a subject like D&T, where portfolio assessment is widely used in the design process, it was expected that teachers would promote self-assessment, which is a significant feature of portfolio assessment and learning. For example, Yang (2003) found that portfolios "raised students' awareness of learning strategies, facilitated their learning process, and enhanced their self-directed learning" (p. 293). Ekbatani and Pierson (2000) note that even if teachers recognise the worth of learner-directed assessment, they show apprehension towards it. On this note, Bullock (2011) underlines that teachers' primary concerns are time, resources and their beliefs about students' capability of assessing their own proficiency. Informal conversations with the three D&T teachers observed reflected Bullock's argument, where the D&T teachers claimed lack of confidence in their students' capability to self-assess their own work. This is not a surprising finding as Little (2002) also claims, based on a project by the Council of Europe's European Language Portfolio, that some teachers doubted their students' capability of assessing their own learning accurately. Little (2002) explains that self-assessment is not readily accepted and adopted where the scholar academic ideology (Schiro, 2013) or teacher-led pedagogical traditions dominate.

Research indicates that learners who use peer-assessment outperform their peers who do not use it (Sluijsmans, Brand-Gruwel, & Merriënboer, 2002; van Gennip et al., 2009). However, in this study, observations indicated that the D&T teachers did not give their students the opportunity to participate in peer-assessment. A probable reason for the D&T teachers' unwillingness to utilise peer-assessment may be lack of confidence due to inexperience in using alternative forms of assessment.

According to Ballantyne, Hughes, and Mylonas (2002), there are several concerns regarding peer-assessment, such as students regarding assessment as the teacher's responsibility, teachers lacking the confidence to utilise this approach, students' unwillingness to assess their peers, and teachers judging this approach as demanding and time-consuming. The informal interview findings were consistent with previous research, indicating that the D&T teachers believed that peer-assessment would disrupt their teaching, as it is time-consuming. The teachers also alleged that the students did not possess the required skills to participate in peer-assessment. Another reason for teachers avoiding learner autonomy, which emerged during teacher interviews, appeared to be the increase in class sizes (of about 40 students).

### **8.1.5 Improving their practice**

Pedder and James (2011) argue that like students, teachers also go to school to learn. An area of learning where change is required are teachers' practices. According to Shepard (2000), improvements in teachers' practices are needed at two levels—teaching and assessment decisions, and transformational practice—which could be achieved through reflection-in-action and reflection-on-action (Killion & Todnem, 1991; Schön, 1987).

The teacher interviews revealed that 45% of teachers used 'assessment for learning' to improve their teaching and assessment decisions in response to immediate learning requirements. The teachers claimed to use diverse approaches after reflecting on the assessment information, such as re-explaining lessons, changing their teaching strategies, providing students with remedial activities, explaining things in simpler ways, reducing the pace of their explanations and addressing students' confusions.

Reflection-in-action allows teachers to detect a problem as it happens, consider options, and adjust their practice to solve it (Schön, 1987). The observations partially confirmed Schön's (1987) conclusions. Three D&T teachers were applying reflection-in-action corresponding to the assessment information. However, these reflections seemed to be mainly on students' missteps. As a result, the teachers adjusted their practice in response to immediate learning needs. This

finding suggests that the teachers were ineffectively reflecting on their practice, which was evident from their behaviours. A plausible cause appears to be the syllabus coverage. These findings reflect the evidence from B. Marshall and Drummond's (2006) project where they reported that many teachers felt constrained by a context that forced them to rush towards curriculum coverage.

However, when involved with reflection-in-action, the observed teachers inappropriately recorded evidence of students' learning and their own practice. Previous literature underlines that observation and reflection-in-action information which goes unrecorded may be forgotten over time (North Carolina Department of Public Instruction, 1999). It was apparent in Reed's classroom that he was not recording any evidence of students' learning or his assessment practices. An analysis of the teachers' documents indicated that two of the three teachers, Bronn and Renly, recorded superficial information concerning students' difficulties, where there was potential to record more specific evidence. Recognising that unexpected student learning could take place in the classroom, Compton and Harwood (2003) recommend that this should also be recorded as part of overall students' learning as it can be used to establish teachers' future practices of predetermined learning intentions. But the observed classroom practices show that what the teachers recorded could not be used to improve their 'assessment for learning' practices and that they were not adopting basic strategies to enhance their practice.

According to Schön (1987), reflection-on-action is the consideration of an event after it has happened. Thus, teachers may create knowledge by reflecting on their practice, grounded on the collected assessment evidence, and orienting their practice as a result of the knowledge and theories they hold (Ossa Parra, Gutiérrez, & Aldana, 2015). The teacher interviews revealed that a limited number of teachers were applying reflection-on-action corresponding to 'assessment for learning' to transform their practice, including their 'assessment for learning' practices. Four teachers (14%) claimed they used 'assessment for learning' to modify and plan the curriculum, while one teacher stated that he adjusted his teaching plans and reflected on his practice to transform his long-term teaching to improve students' learning. This finding seems to be in line with Shaeiwitz (1996), who claims that

when students have difficulties with certain concepts, then teachers have to make changes to their plan and/or teaching style to ensure that future learners would not face the same difficulties. However, contrary findings from classroom observations indicated that the three D&T teachers were not performing any reflection after completing their teaching and ‘assessment for learning’ practices.

This section answered the research question: What are the teachers’ ‘assessment for learning’ practices? The NCFS advocates sociocultural theorising, but the teachers’ practices are inconsistent with the sociocultural framework of the policy document. There is evidence in this study suggesting that a significant number of teachers’ ‘assessment for learning’ practices follow a mechanistic model (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009), which seems to be due to the lack of foundational knowledge of ‘assessment for learning’ strategies.

The next section will answer the sub-research question: What guidelines are the teachers using for their ‘assessment for learning’ practices? The following five sub-headings present the guidelines that the teachers used: syllabus and textbooks, curriculum framework, Cambridge International Examinations documents, school policy, and experiences and knowledge.

## **8.2 Guidelines used to implement ‘Assessment for Learning’**

Teachers use various documents as guidelines when enacting ‘assessment for learning’. The guidelines that teachers use seems to depend on their beliefs and educational goals, such as students’ learning and/or student preparation for examination, school policies and country or state education policies (Silver & Steele, 2005). This section discusses the guidelines that D&T teachers used to enact their ‘assessment for learning’ practices in Mauritius state secondary schools.

### **8.2.1 Syllabus and textbooks**

Westbury (2008) considers the syllabus as a guide to the curriculum. In this study, the interviews highlighted that the syllabus was the primary document that teachers frequently consulted to plan and enact their ‘assessment for learning’ practices. It

seems that teachers followed this guideline primarily because they considered one of their core responsibilities was to complete the syllabus and prepare students for both internal and external end-of-year examinations. In parallel findings, Dindyal and Besoondyal (2007), who conducted a qualitative study in Mauritius involving 20 teachers, found that Mathematics teachers stick to the syllabus with the aim of completing it, so that students were well prepared for examinations.

Luke et al. (2013) argue that the “syllabus is not and cannot be comprehensive and exhaustive” (p. 11) and hence should not dictate pedagogical and assessment approaches. However, six teachers (17%) claimed to follow the syllabus to the letter. The interview findings appear to be consistent with teachers’ practices in Pakistan who were expected by parents and pupils to complete the syllabus in a specific way (Halai, 2011). The expectations from the different stakeholders that teachers complete the syllabus and prepare students for examination could be a possible explanation that led teachers to follow the D&T syllabus to the letter. Similarly, Connelly and Connelly (2013) add that the role of the syllabus is to enhance teacher professionalism and not to restrain or de-professionalise their practice. Nevertheless, in this study, it seems that teachers regulated their ‘assessment for learning’ practices in line with the syllabus.

The prescribed textbooks provided more ‘assessment for learning’ guidelines that the D&T teachers used. Textbooks are important resources used to assess students’ learning, as these guide teachers in their practice, such as what will be assessed (Nicol & Crespo, 2006). The interviews revealed that the teachers used the D&T textbooks’ activities when enacting ‘assessment for learning’ to demonstrate that they were covering the syllabus. According to Kumar (1988), when textbooks are chosen by schools, often these act as a syllabus, and teachers have no choice of curriculum organisation, pace of lessons and mode of final assessment. The findings suggest that the teachers used textbooks, which they considered as the syllabus. Several teachers said that when they used the textbooks’ activities on a daily basis, this saved time and energy; a finding consistent with Nilsson’s (2006) study involving three teachers and three students from a secondary school in Sweden.

The observations were consistent with the interviews, underlining that two of the three teachers, Bronn and Renly, used the prescribed D&T textbooks to set ‘assessment for learning’ activities regularly. Renly also used the textbooks’ activities to organise tests. According to Richards (2001), although textbooks are helpful to teachers for setting ‘assessment for learning’ activities, there are some potential disadvantages. For example, textbooks do not necessarily contain activities that reflect students’ needs and interests, and thus may require adaptations. Also, over-reliance on textbooks makes teachers less creative. They may merely present materials prepared by others, thus affecting both teachers’ professional capacity and judgement, and students’ learning (Nilsson, 2006; Richards, 2001). Based on this reasoning Luke et al. (2013) recommend that curriculum resources be assembled and developed by teachers, who may also collaborate with their country’s curriculum planning and design department.

Remillard (2000), who conducted two case studies in the United States involving two mathematics teachers during their first-year use of new textbooks, claims that textbook use could contribute to teacher learning. Teachers learning from textbooks could potentially mean improved ‘assessment for learning’ practices. Remillard (2000) found that when teachers are involved in determining how to interpret students’ thinking and how to design tasks based on what was presented in textbooks, it provides them with better learning opportunities than when following textbooks to the letter or using these in standard ways. It was evident from the observations that D&T teachers used textbooks in standard ways. Awasthi (2006) warns that for many teachers, prescribed textbooks may become the curriculum in the classroom if they follow the text verbatim, which appeared to happen in this study.

### **8.2.2 Curriculum framework**

The national curriculum framework is a document that provides teachers with a clear and shared understanding of the knowledge and skills that students should gain at school, including their subject or discipline (Apple, 1986; Voogt & Roblin, 2012). Although most of the D&T teachers possessed a teaching qualification (79%) and had taught the subject for several years, only 31% of the teachers interviewed claimed to refer to the *National Curriculum Framework: Secondary*. It is of concern



that the NCFS had such a minor role in these teachers' beliefs regarding 'assessment for learning'. This finding seems consistent with those of McLachlan, Carvalho, de Latour, and Kumar (2006), who surveyed 107 early childhood teachers in New Zealand and investigated the teachers' views on the ways the national curriculum (Te Whāriki) influenced their practice. McLachlan et al. (2006) found that 50% of the teachers considered their national curriculum simply strengthened previously-held beliefs or had little to no impact on their practice.

Of the teachers interviewed in this study, 10% seemed to enact 'assessment for learning' in line with the NCFS, while 21% gave vague responses, were not able to explain how they used the document or partially disagreed with the NCFS objectives. This finding indicates that the teachers were not receptive to the curriculum. This oppositional stance on the curriculum corresponds to Foucault's (1977, 1978) notions of power and resistance, in which teachers exercise power by displaying resistance to national policy. This could be an outcome of a linear top-down model of policymaking (Darling-Hammond, 1990), indicating the troubled relationship between policymakers and teachers, who have significant control over policy implementation (Osgood, 2004). One possible solution could be the requirement of a bottom-up perspective, which invites D&T teachers to inform policy decisions.

One of the teachers out of the 10% who claimed to use the NCFS for his 'assessment for learning' practices was observed. However, the observations showed that Renly was not actually using the NCFS to plan the learning intentions and enact 'assessment for learning'. It seems that Renly used the NCFS as a guideline to consult what content had to be taught and assessed. These findings might be explained by McLaughlin (1987) who claims that policy success rests on two main factors: capacity and will. Capacity is considered problematic but undoubtedly could be addressed through professional education (McLaughlin, 1987). Professional learning in Mauritius is problematic, as the questionnaire indicated that the D&T teachers never benefited from any professional learning and development associated with the NCFS, so teachers' lack of use of the curriculum is arguably not that surprising.

The interviews also suggested that some experienced teachers with teaching qualifications were not aware of the existence of the NCFS. This implies that some of the teachers (and principals) were not having conversations associated with the goals and ‘assessment for learning’ practices recommended by the NCFS. This result could be explained by McLaughlin’s (1987) second factor, will, which is less responsive to policy intervention and is about beliefs, motivation and attributes. Likewise, this finding is in line with Bourdieu’s (1977) notion of habitus, which explains that teachers maintained the status quo. Possibly some teachers were motivated to prepare students for examinations, irrespective of policy reforms and their previously-held beliefs remained intact; thus, they remained committed towards their previous assessment approaches. Foucault’s (1997) concept of ‘games of truth’, which is about a subject’s power within their practice, is also helpful to analyse this finding. With this notion, subjects and/or institutions determine the terms of the game, which is about establishing a set of rules by which truth is produced (Hall & Noyes, 2009; Stirling & Percy, 2005). In this case, the institutional and discursive practices of teachers showed they considered the NCFS invalid.

### **8.2.3 Cambridge International Examinations documents**

The interviews indicated that when the D&T teachers enacted their ‘assessment for learning’ practices, they used various Cambridge International Examinations documents: 55% used past questions, 34% utilised examiners’ reports and 10% used the marking criteria. Possibly the D&T teachers were using the various Cambridge International Examinations documents due to the stress and pressure created by the examinations on schools, teachers and students. According to M. L. Smith and Rottenberg (1991), external testing tends to encourage the use of materials that resemble the examinations. The classroom practices observed were somewhat consistent with the interview findings, as one teacher, Reed, used past examination questions when setting classwork. Because of standardised testing, according to Volante (2004), often teachers feel motivated to organise long sessions for students to practise questions, which was in line with Reed’s ‘assessment for learning’ practices.

Laveault and Allal (2016) claim that the goal of ‘assessment for learning’ is “to ensure adaptation of teaching and learning activities in ways that will enable students to attain intended learning outcomes of schooling” (p. 4). Instead, in this study, the D&T teachers seemed to focus on students’ achievement. The D&T teachers’ approach could be justified by the beliefs that they held for learning and schooling. These beliefs could have emerged from teachers’ experiences of their schooling in similar education settings (Bronfenbrenner, 1979; D. I. Cross & Hong, 2012). It could also be that teachers considered that establishing an examination environment provided students with incentives to work harder and be more disciplined and attentive in ‘assessment for learning’ activities (M. James & Pedder, 2006).

Another possible explanation is the pressure of preparing students for testing that teachers experience from those in authority (the ministry, principals and school board) and other invested stakeholders (parents and students) (Darling-Hammond, 1990). According to Pelletier, Séguin-Lévesque, and Legault (2002), the environmental conditions of the school lead teachers to adopt specific behaviours. For example, a study conducted by Flink, Boggiano, and Barrett (1990), involving 15 teachers and 267 students from grade 4 from the Colorado district, found that when teachers are considered accountable for students’ performances in standardised testing, they focused more on preparing students for tests than on students’ learning. This finding is of particular relevance to the present study.

#### **8.2.4 School policy**

According to Moreland and Jones (2000), classroom-based assessment “does not exist in isolation.... [but] is informed by” (p. 285) a school’s assessment policy. In this study, the interviewed teachers claimed to follow their school’s policy when they enacted their ‘assessment for learning’ practices. The classroom observations were consistent with the teacher interviews, showing that the teachers conformed to their school’s policy. However, there seems to be an anomaly between what certain teachers claimed to follow, and what their school’s policy suggested. For example, one school’s policy required teachers to conduct assessments, but the teachers were continuously organising tests for accountability purposes. This difference could be explained by research highlighting misunderstandings between

the formative and summative purposes of assessment by different stakeholders (Harlen & James, 1997; Hayward, 2015; Taras, 2010; Ussher & Earl, 2010).

Misunderstandings were evident at one of the schools, Greenfield, where Bran and Davos had conflicting views of their school's policy. These teachers disagreed on their school's policy regarding formal assessment corresponding to the variety of assessment techniques they could use, whether it was tests or assessments. Similarly, the D&T teachers involved in this study seemed to conflate formal formative, informal formative, informal summative and formal summative assessment (Harlen, 2007). This possible misunderstanding occurred because the schools were not differentiating between types of assessments (and purposes of assessments) or expected teachers to be able to discern between the various assessment terms.

Moreland and Jones (2000), who investigated assessment in two New Zealand schools and involved nine primary teachers, found that the teachers' school policy influenced their 'assessment for learning' practices. The authors report that "formative assessment was not well understood in technology" (p. 302), and that the school's policy influenced the teachers' assessment practices. Similarly, it seems that the school's policy in one way or another was affecting D&T teachers' 'assessment for learning' practices in this study. Lack of assessment literacy is a possible explanation, leading teachers to adopt assessment practices that only prepare students for tests and examinations (Popham, 2009). However, it could also mean that the D&T teachers did not have the appropriate support to adopt 'assessment for learning' practices.

### **8.2.5 Experiences and knowledge**

According to Moreland and Jones (2000), teachers' assessment practices are influenced by their experiences and subject expertise. In this study, it was evident that the D&T teachers relied on their knowledge and experiences when enacting their 'assessment for learning' practices. For example, the interviews identified that several teachers designed 'assessment for learning' tasks based on their knowledge and experiences. This finding was consistent with the observation findings which indicated that two of the teachers developed activities (without referring to any plan or guideline) based on their knowledge and teaching experiences.

Research studies suggest that teachers' experiences affect their beliefs and practices (D. I. Cross & Hong, 2012; Edgerton & Roberts, 2014; Handal & Herrington, 2003). The classroom practices confirmed that the teachers were using 'assessment for learning' approaches for quite some time. Possibly for the teachers, these approaches were effective in what they wanted to achieve (their goals). One probable explanation is that the D&T teachers' practices (teaching and assessment) influenced their 'assessment for learning' beliefs (Buehl & Beck, 2015; Lumpe et al., 2012). It could also be that the teachers' beliefs affected their 'assessment for learning' practices (G. T. L. Brown, Kennedy, et al., 2009; Fives & Buehl, 2012).

This section answered the research question: What guidelines are the teachers using for their 'assessment for learning' practices? Most teachers were closely tied to using textbooks and Cambridge International Examinations documents when they enacted their 'assessment for learning' practices. It appears that most teachers relied on these documents which, according to them, were appropriate for preparing students for examinations and were time-saving since they did not had to prepare 'assessment for learning' resources. Teachers also relied on their school's assessment policy. However, it seems that they conflated different types of assessment practices. This conflation could be due to teachers' lack of assessment literacy and/or reliance on their experiences and knowledge. Conversely, the NCFS as a guideline for enacting 'assessment for learning' seemed to be ignored by the D&T teachers.

The next section will answer the sub-research question: What are the teachers' rationales for implementing 'assessment for learning'? Four themes were identified indicating the teachers' rationales for enacting 'assessment for learning': accountability, improving practice, enhancing students' learning and preparing students for examinations.

### **8.3 Rationales for Implementing 'Assessment for Learning'**

G. T. L. Brown, Kennedy, et al. (2009) found that teachers in different settings have different beliefs around 'assessment for learning'. Barnes, Fives, and Dacey (2015)

explain that teachers may hold a variety of assessment beliefs, which when combined with other beliefs (individual or collective) and contextual factors (external) affect teachers' assessment practices. Fives and Buehl (2012) argue that it is the outcome of all these influences that shape teachers' lesson plans, the activities they use, how they give feedback and whether they support learner autonomy. The following sub-themes under this section emphasise the D&T teachers' rationales for implementing 'assessment for learning' practices in Mauritius state secondary schools.

### **8.3.1 Accountability**

Ten D&T teachers (34%) who were interviewed claimed that they carried out 'assessment for learning' because it was their duty, which corresponds to Foucault's (1977, 2006) notion of disciplinary power. This notion relates to controlling people by reducing them into docile bodies (Bowdridge & Blenkinsop, 2011). It could be that these D&T teachers considered 'assessment for learning' as their duty because they were positioned within a system that informed them about what was recognised as acceptable, such as assess students' works and report to parents. At the same time, it could be that the teachers were reminded that they were constantly being observed. Following Foucault's (1977) reasoning, it can be argued that the teachers' 'assessment for learning' would be seen as most effective when they take responsibility for themselves and become their own inspectors, which seemed to occur in this study. In other words, a regime of self-surveillance on their assessment practices resulted in internalisation of the school assessment demands (Schrift, 2013), causing D&T teachers to consider assessment as their responsibility.

Due to accountability, several D&T teachers claimed to monitor students' classwork and allocate marks. These teachers seemed to believe that receiving marks forced students to put in extra effort when attempting activities and accordingly their learning would improve. Even when marks were not used for the end-of-term grades, some teachers—mostly beginners who had recently completed their secondary schooling and had no teaching qualifications—still allocated marks on every student's work. This finding also relates to Foucault's notion of disciplinary power; however, in a different hierarchy, where teachers used disciplinary power over students. Hargreaves (1989) and M. James and Pedder

(2006) argue that teachers appropriate such assessment approaches to improve students' learning and/or for social control. In this case, it appears some teachers used disciplinary power to improve students' learning, while others, mainly beginners, allocated marks to control students' behaviour.

The assessment approaches adopted by D&T teachers are consistent with the approaches found in previous research, that is, the assessment approaches espoused by teachers in the classroom may be based on a variety of beliefs they hold about assessment (Barnes et al., 2015; G. T. L. Brown, 2004; D. S. Davis & Neitzel, 2011). These beliefs act like filters and amplifiers, and influence teachers' practices (Fives & Buehl, 2012). Possible causes of differences in teachers' beliefs could be the variations in teachers' positions in the social space (Bourdieu, 2005) or the economic, cultural and social capital they possess (Bourdieu, 1986). Teachers' previous experiences could also lead to particular beliefs about assessment, which can be linked to the influences identified in Bronfenbrenner's mesosystem (Bronfenbrenner, 1979; D. I. Cross & Hong, 2012). According to Bronfenbrenner (1979), the child mesosystem, which includes the school, may be a setting where teachers acquire specific assessment beliefs. The beginner teachers' assessment practices may have been shaped by their prior learning experiences, which they have consciously or unconsciously embodied, thus later replicating these when enacting their 'assessment for learning' practices. Without the cognitive conflict and alternative models that initial teacher education provides, teachers simply repeat the discourses and teaching practice from their own school environment (Darling-Hammond, 2000).

The observations showed that the D&T teachers seemed to record 'assessment for learning' information for accountability reasons, rather than to support students' learning. The teachers used previously planned lessons or wrote their plans after the lessons, used prescribed activities and corrected students' activities, where they wrote short comments indicating that these were checked as demanded by their school's administration. Foucault's (1997) notion of 'games of truth' can be used to explain this result, and in this case the teachers determined the terms ('assessment for learning' evidence) of the game. This result shows that the D&T teachers were producing truth (accumulated evidence) that schools requested, despite their

unwillingness, to prove that they complied with their school's rules and procedures. However, an analysis of teachers' documents suggests that some of the evidence was superficial, indicating that the teachers entered and played the game to best advantage (Peters, 2004). This finding could also be linked to Hollander and Einwohner (2004), who argue that individuals can be powerful and powerless at the same time within a system, indicating that teachers are able to resist and respond to power relations (Lilja & Vinthagen, 2014). In other words, the D&T teachers had no control over some decisions, so they accepted them. However, the teachers resisted and responded accordingly by doing things in their own ways. Based on this reasoning, Peters (2004) claims the outcomes of such decisions may be considered as valid or invalid.

Duchesne et al. (2013) argue that teachers' 'assessment for learning' practices are influenced by broader factors which are beyond teachers' control. These might involve the government and regional educational bodies whose decisions indirectly—positively and negatively—affect teachers' 'assessment for learning' practices. From the interviews, it seemed that the D&T teachers 'assessment for learning' were affected by several factors that were outside their control, and some teachers did show their apprehension. This relates to influences in Bronfenbrenner's exo- social system (D. I. Cross & Hong, 2012; D. Price & McCallum, 2015), within which teachers do not interact directly. The interview findings appeared to indicate that accountability issues, which are decided by the Ministry of Education (MOE), strongly influenced teachers' 'assessment for learning' practices.

### **8.3.2 Improve practice**

The interviews highlighted that D&T teachers were aware of the concepts of reflection-in-action and reflection-on-action. Of concern was that many teachers were not effectively reflecting on their practice, including 'assessment for learning' practices. According to Leahy and Wiliam (2011), one possible explanation could be the pace at which work (teaching and assessment) is done, thus leaving little time for reflective thoughts. It seems that as much as anything else, the D&T teachers' behaviours were controlled by their habits.



The evidence from the teachers' classroom practices seemed to indicate that the teachers were almost not applying reflection-on-action to their 'assessment for learning' practices. A possible explanation could be the various changes and expectations teachers are undergoing in their daily practice. Ballet and Kelchtermans (2009) claim that due to job intensification (Apple, 1986), which is related to the multiple responsibilities teachers are expected to deal with, teachers complain about their workload. As a result, many teachers may be unwilling or struggle to adopt reflection-on-action.

Reflection-on-action is associated with experiential learning, involving thinking back to a previous performance, such as 'assessment for learning' practices, and identifying what was done effectively and how things could be improved (Grant, 2002). According to two teachers, Bronn and Renly, who had more than 10 years of teaching experience, their teaching and 'assessment for learning' experiences were enough for them to conduct 'assessment for learning' effectively. They believed that their 'assessment for learning' practices did not require any transformation. This finding is in line with Bourdieu's (1977) concept of habitus, which explains why individuals maintain the status quo.

Renly, the teacher with the least experience, claimed to be willing to use 'assessment for learning' and reflection-on-action, and transform his practice. However, he mentioned facing challenges from the D&T department and school, and of syllabus coverage. Renly's willingness to transform his practice could be explained by teacher autonomy, which Aoki (2002) and Ramos (2006) define as the freedom, capacity and responsibility of teachers to make choices related to their practice. This finding aligns with Foucault's notions of resistance (1978) and freedom (1982). Perhaps Renly was at a stage where he was beginning to resist the disciplinary power imposed by the school and D&T department. However, the outcome of Renly's self-reflexiveness on transforming his practice is unknown, and he could potentially subjugate to or abide by the current norms. Resistance requires considerable self-efficacy as a teacher (Rosenholtz, 1989).

### **8.3.3 Enhance students' learning**

According to Wiliam (2011a), when 'assessment for learning' is appropriately used, students' learning can be enhanced. In this study, the classroom practices indicated that Reed did not give many activities for students to work on compared to Bronn and Renly, as he believed that the quality rather than quantity of activities was helpful for students' learning. Both Bourdieu's (1977) notion of autonomy of agents and Bronfenbrenner's (1979) ecological concept make sense of this finding. In an investigation involving seven experienced teachers from two secondary schools in Scotland, Priestley, Edwards, Priestley, and Miller (2012) found that when school policies are at odds with reform policies, rather than abide by the school's policy, experienced teachers may establish their own beliefs. Priestley and colleagues' (2012) study is in line with this study which indicated that Reed was making choices to enhance students' learning as well as transform his 'assessment for learning' practices. Perhaps Reed was transforming his 'assessment for learning' practices subject to his own areas of interest and belief about how students learn. Similarly, Renly used demonstration strategies to show students what quality work resembled, while highlighting the success criteria. Several authors claim that prior experiences, growth and social influences shape individuals' sense of agency (Bourdieu, 1977; Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006; Edgerton & Roberts, 2014), which seems associated with Reed's and Renly's approaches of 'assessment for learning' practices.

From the interview findings, it appeared that the 'assessment for learning' strategies that the teachers used were aimed at improving students' learning. These findings seemed consistent with the teachers' classroom practices. This finding could be explained by Foucault's (2002) notion of discourse, which describes the way individuals make sense of their understanding and experiences. In this case, it seemed that many D&T teachers considered that the tasks and approaches to assessment they had adopted in their classroom would automatically lead to students' learning. It appears that the D&T teachers' 'assessment for learning' approaches and assessment beliefs may be due to the society's structures and how the society is managed (McHoul & Grace, 1998). In this case, it could be how 'assessment for learning' was commonly managed within the state secondary schools and D&T departments in Mauritius.

It is widely known that feedback can strongly influence students' learning (Falchikov, 2004). However, to maximise the effectiveness of feedback, it should be helpful to students. Both the interviews and classroom practices indicated that the D&T teachers provided students with feedback, but teachers' feedback mostly focused on students' weaknesses and were in the form of answers rather than in the form of conversations with learners. It appeared from the teachers' perspectives that their feedback was helping students to learn. Lack of assessment literacy might be a potential cause for teachers' misinterpretation of how feedback ought to be provided. Stiggins (1995) argues that when teachers are assessment literate, they know the difference between sound and unsound assessment, and, in this case, teachers' understanding of sound and unsound feedback seemed limited.

Lee (2008) claims that the feedback process, including students' responses, takes place between teachers and students in a particular context, and is influenced by several aspects of the context. Deneen and Brown (2016) argue that there is a relationship between assessment literacy (related to feedback) and teachers' assessment beliefs. If teachers' assessment beliefs are unchanged and unchallenged, then it is likely their practice might not change (Fulcher, 2012). In this study, it was evident that the teachers' feedback approaches varied, which might be associated with their beliefs and assessment literacy. This diversity of approaches could be explained by influences in Bronfenbrenner's (1979) microsystem and Bourdieu's (1990, 1992) notion of logic of practice. In line with Brofenbrenner's (1979) concept, the main setting for teachers is the school, where reciprocal interactions occur with colleagues (including principals), students and parents (D. I. Cross & Hong, 2012). Similarly, Bourdieu (1992) claims that agents (teachers) within the field (school or department) adopt specific habits, often formed due to routine requirements, rules and/or regulations, which inform their practice (teachers' feedback in this case). These interactions with individuals close to the teachers might influence assessment beliefs and ultimately their feedback. It could be that D&T teachers' assessment practices were influenced by the instructivist perspectives (Bryant et al., 2013; Paciotti, 2013), which they learned from students and their parents, inspectors from the MOE, colleagues and principals. Hence, for

example, they believed that it was their role to identify students' mistakes and correct them.

#### **8.3.4 Prepare students for examinations**

The interviews revealed that the D&T teachers used their 'assessment for learning' practices to prepare students for internal and external examinations. The majority of the teachers (97% of the 29 interviewed) claimed to adopt this approach, which could be attributable to the long history of testing policies in Mauritius (Novak & Carlbaum, 2017). The observations were consistent with the interviews, which indicated that teachers focused more on specifying to their students how to obtain marks, complete tasks and pass examinations rather than how to improve their work and analyse design problems. This result could be linked to Foucault's (2002) concept of discourse, which relates to power relations. Like power, discourse is considered to shape and create meaning by constraining the production of knowledge and enabling new knowledge (Foucault, 1971, 1977). In this study, teachers' 'assessment for learning' practices were shaped by the dominant discourses used within schools and communities. In this case, preparation of students for examinations was the dominant discourse.

In this study, teachers seemed to believe that students needed to work individually when enacting 'assessment for learning' practices, similar to examination situations where they had to complete their tasks within a specific amount of time. This corresponds to Bourdieu's (1990) sense of game concept. People's sense of game within an institutional setting can lead to producing particular habitus (Lamaison & Bourdieu, 1986). In this study, it seems that despite teachers having various assessment beliefs, they all formed the habit of using their 'assessment for learning' practices to prepare their students for examinations.

The D&T teachers' use of their 'assessment for learning' practices to prepare their students for examinations could also be associated with teachers' beliefs, knowledge and experiences. The findings show that the D&T teachers used different approaches when they prepared students for examinations. For example, when the teachers were observed, they gave standard questions for students to practise. Two of them used textbook activities, while the other teacher utilised past

examination questions. Similarly, one teacher focused on how maximum marks would be obtained while another emphasised the time within which tasks should be completed. This finding corresponds to Bronfenbrenner's (1979) ecological model and Bourdieu's (1986) notion of capital. Teachers with different beliefs, experiences and knowledge could be the reason for teachers using different approaches to prepare students for examinations. Teachers' beliefs could emerge from their involvement of their own schooling (Bronfenbrenner, 1979). Capital can be regarded as resources or influences that regulate teachers to adopt certain approaches as they enact their 'assessment for learning' practices (Adam, 2015; Bourdieu, 1986; Edgerton & Roberts, 2014). In this case, it is possible that teachers had limited assessment capital, which constrained potential assessment practices.

In addition, many authors argue that lack of assessment literacy, communities of practice, and professional learning and development are a central reason for teachers adopting such practices. The extant research (DeLuca & Bellara, 2013; DeLuca & Johnson, 2017; Desimone, 2009; Koh, 2011; Koh et al., 2012) indicates that teachers' assessment literacy is fundamental for enhancing their practice. However, several authors (Farnsworth et al., 2016; Poskitt, 2014; Wenger, 1998) argue that teachers should be involved in communities of practice and professional learning and development because daily assessment practices may not be changed through traditional methods of teacher education, such as workshops (William, 2012). It is evident from the findings that teachers were not involved in communities of practice, or professional learning and development in assessment, specifically in 'assessment for learning'.

This section answered the research question: What are the teachers' rationales for implementing 'assessment for learning'? It appears the main reasons motivating the teachers to enact 'assessment for learning' were accountability to their schools and the MOE, social control of students, preparing students for tests and examinations, and enhancing students' learning. However, teachers overlooked opportunities to improve their 'assessment for learning' practices through reflexivity.

The next section will answer the sub-research question: What are the students' conceptions of 'assessment for learning'? Four themes were identified:

understanding of the terms assessment and ‘assessment for learning’, conceptions of feedback, conceptions of collaboration, and conceptions of self- and peer-assessment.

## **8.4 Students’ Conceptions of ‘Assessment for Learning’**

G. T. L. Brown, Irving, Peterson, and Hirschfeld (2009) claim that an analysis of students’ attitudes towards assessment may aid revealing “important factors in what students do before, during and after assessment” (p. 1). This section discusses the findings under four themes to indicate how D&T students in this study conceptualised ‘assessment for learning’.

### **8.4.1 Understanding of the terms assessment and ‘assessment for learning’**

In their survey involving 3469 New Zealand secondary school students, G. T. L. Brown and Hirschfeld (2008) found that students held four significant assessment conceptions: assessment is irrelevant, assessment improves quality of learning, assessment makes students accountable, and assessment is enjoyable. In this study, the D&T students interviewed also had various interpretations of the term assessment. Teachers’ assessment practices were considered by students to mainly check students’ understanding and prepare them for tests and examinations. The students also seemed to associate assessment with tests and examinations. The results of this study are somewhat similar to students’ understanding in G. T. L. Brown and Hirschfeld’s (2008) research associated with the concept of student accountability that includes assessment as assigning a grade or level and checking off progress. However, the participants in the current study did not mention assessment as irrelevant.

The students considered ‘assessment for learning’ to have several purposes and they understood that the main purpose was to improve their learning. It could be that students’ conceptions of ‘assessment for learning’ originated from their teacher’s beliefs of ‘assessment for learning’ (Gebril & Brown, 2014). The notion of having similar conceptions of ‘assessment for learning’ with their teachers is in line with Bronfenbrenner’s (1979) microsystem, which considers learners’ immediate

environment (in this case the classroom) to influence their understanding. However, Bronfenbrenner (1979) also argues that students influence their environment. Therefore, the notion of having similar conceptions of ‘assessment for learning’ might also be due to students influencing their teachers’ practices.

Even if most students understood that the principal purpose of ‘assessment for learning’ was to help them learn, they had conflicting views related to their teachers giving different ‘assessment for learning’ activities to their peers in the same classroom. Most students commented that their teachers should provide the same activities to all students. This belief may have arisen from the students’ previous experiences where they were exposed to a competitive environment in primary and secondary schools.

Another possibility of students having views which conflicted with their teachers’ practices of giving different activities to different students may be associated with Popham’s (2014) notion of students’ assessment literacy. It could mean that the D&T students were insufficiently exposed to assessment literacy. Thus, they were unable to understand the goals of each activity. According to Stiggins (2014), students should be allowed to know the purpose of each assessment activity they undertake. But it seems that the D&T students were not aware of the purposes of the activities set for them. Another possibility is that because their teachers gave marks on most classroom activities, they considered that they would be disadvantaged if they were not given the same activity. This was a factor which some students mentioned during the interview.

The students identified another purpose of ‘assessment for learning’ was to prepare them for examinations. G. L. T Brown (2002) claims that students consider themselves accountable for their performance on assessments due to the consequences of high-stakes examinations, such as selection or promotion. In this study, it is evident that students were held accountable for their performance in high-stakes examinations in primary schools (see section 3.1.2: Reforms). Another dimension of student accountability is the award of marks through continuous internal assessment that contributes towards a grade being awarded (G. T. L. Brown, 2002). In this study, 34% of the 16 students interviewed linked ‘assessment for

learning' practices with marks. These findings could correspond to Bronfenbrenner's (1979) ecological model, which considers social influences of the society to have an effect on individuals. In this study, the students' understanding of 'assessment for learning' as an instrument to prepare them for examination seemed to come from interactions with individuals in their proximity, such as parents, peers, teachers and principals, and others such as the MOE, who indirectly affected their day-to-day life.

One student, Daniel, associated 'assessment for learning' with teaching improvement. Daniel's understanding seemed to come from his mother, who was a secondary school principal, indicating that the home environment influenced the child's 'assessment for learning' conceptions. Both Bronfenbrenner's (1979) model and Vygotsky's (1978) theory make sense of this finding. Bronfenbrenner and Vygotsky both argue that children gain language and cultural tools from their immediate home and school environment (Pound, 2011; Zimmerman & Bell, 2012).

#### **8.4.2 Conceptions of feedback**

Hattie and Timperley (2007) conceptualise feedback as "information provided by an agent ... regarding aspects of one's performance or understanding" (p. 81). They explain that the agent is not merely a teacher, peer or parent, but can also be a book, experience and the self. However, this study has demonstrated that the 14-year-old students considered an agent to be other individuals, such as a teacher, peer or parent. Bronfenbrenner's (1979) ecological model can be used to explain this finding, which indicates that the students' understanding of agent possibly originates from individuals close to them (Bronfenbrenner, 1979; Mligo, 2015), such as their parents and teachers. It could be that individuals in the students' proximity considered that feedback on one's performance should be given by individuals who can identify mistakes and provide guidance.

According to Sadler (2010), for feedback to achieve its formative purpose, it has to be specific as well as general. Sadler (2010) adds that "although feedback is mainly retrospective, it has a prospective orientation as well" (p. 538). In this study, the students seemed to refer to both the specific and general, as well as the retrospective and prospective orientations. However, they appeared to focus more on the specific



and retrospective than general and prospective orientations. For instance, the students appeared to equate feedback to correct answers (specific) provided by their teachers. These students stated that after receiving their teacher's feedback, they followed the explanations, often to the letter, to correct their activities. It suggested that, for the students, their teacher's feedback was final. It is possible that they considered their teacher's feedback as specific information that would fit in all situations. Thus, interpretations and adaptations of their teacher's feedback were not required.

When the students referred to the general and prospective orientations, it was primarily in connection with examinations and tests, and not about developing understanding and looking at things from different angles, or questioning them. For example, the students asserted that the reason for receiving teacher feedback was also to avoid repeating mistakes. It seems that these students trusted their teachers to point them in the right direction. The students expressed that the teachers' guidance should be used to improve their tasks and perform well on tests and examinations. These findings suggest that such student beliefs related to teacher feedback might have emerged from their social interactions (Bronfenbrenner, 1979) and habitus (Bourdieu, 1977). It might be possible that students in this study acquired these conceptions of feedback from the ways their teachers and parents provided feedback and how they were taught to benefit from it. This is not a surprising finding. For example, drawing on results from a research centred on student engagement with feedback, involving undergraduates and postgraduates from three universities in the United Kingdom, M. Price et al. (2010) argue that students have the competence to judge the usefulness of feedback. However, M. Price et al. (2010) add that due to lack of assessment literacy students may not always identify the benefits of feedback. Accordingly, Stiggins (2014) argues that assessment literacy is something that students need to be taught.

There is a considerable body of literature suggesting that peer feedback enhances students' learning because learners are actively involved in the process (Falchikov, 2004, 2005; N.-F. Liu & Carless, 2006). N.-F. Liu and Carless (2006) define peer feedback as "a means of communication process through which learners enter into dialogues related to performance and standards" (p. 280). The students in this study

reported that they had verbal exchanges with their peers and believed it helped them in their learning. It could also be that the D&T students felt motivated by peer feedback, which is consistent with Falchikov's (2005) point of view.

However, the findings also suggest that D&T students did not understand how to make effective use of peer feedback. A possible explanation could be that the students considered peer feedback as telling, guiding and developing an understanding, but not much towards having a different perspective, which might be due to lack of students' assessment literacy (Popham, 2014; Stiggins, 2014). This study's results are inconsistent with McLean, Bond, and Nicholson's (2015) study where 28 undergraduate students in New Zealand were interviewed. It was found that there were variations in how students conceptualised feedback, which included students considering feedback as opening up a different perspective. This difference in approach could be due to differences in students' context, knowledge and experience. Another possible explanation of students' lack of understanding of peer feedback could be the nature of the subject, which is considered different (due to its dominantly practical nature) from other subjects (Eggleston, 1994). So students might have felt disoriented with the process of peer feedback in D&T.

#### **8.4.3 Conceptions of collaboration**

When asked about student-to-student collaboration, the students from different schools claimed to collaborate differently. It was also apparent from the classroom observations that the students' approach to collaboration varied. Maybe it was due to the variation in autonomy allowed by their teacher. This finding relates to Foucault's notion of freedom (1982) and resistance (1978). Some students had the freedom to move around the classroom and collaborate with their peers. Other students who were denied the opportunity to collaborate in the classroom often resisted and were consequently disciplined by their teacher. However, those students who were unable to collaborate in the classroom collaborated at other times, such as outside the D&T classes, possibly because they realised that collaboration helped them in their learning. For example, the students described that when they had learning difficulties, they would approach their peers who understood how the task had to be done.

Several research studies suggest that students adjust their learning approaches, which is believed to be related to their intentions, motives and strategies regarding learning (Biggs, 2011; Law, Chan, & Sachs, 2008; Mason & Scirica, 2006). It seems that students' conceptions of learning are what drive those intentions, motives and strategies (Chan & Chan, 2011). In their research, Chan and Chan (2011) examined 521 secondary school students in Hong Kong to understand students' views of collaboration and learning. According to Chan and Chan (2011), if learners consider learning to occur individually, then most probably they would less likely be engaged in collaboration. This finding is consistent with most of the students in Renly's classroom, who seemed to prefer to work individually.

However, the students in Renly's classroom frequently acted as a team regarding homework, tests and examinations, but outside the D&T classes. This finding corresponds to Foucault's (1977) notion of disciplinary power of normalising gaze. It could be that the students' behaviour in the classroom was subject to the notion of examination, which positioned their bodies within a system (Bowdridge & Blenkinsop, 2011) reminding them that their teacher, Renly, was observing them. However, outside the classroom, the students knew their teachers would not judge their behaviour based on norms. Thus, they adopted strategies, such as collaboration, which they believed was helpful in their learning.

During the interview, students also shared their views on the benefits and limitations of collaboration with peers. The students seemed to have a good understanding of collaboration. It could be that the students' understanding of the benefits and limitations originated from their past practice of collaboration (Bourdieu, 1977; Bronfenbrenner, 1979; Edgerton & Roberts, 2014). However, it seems that they were not able to fully benefit from collaboration, which might be due to lack of students' assessment literacy (Bloxham & Campbell, 2010).

#### **8.4.4 Conceptions of self- and peer-assessment**

Thirteen students (81%) said they used self-assessment, but they had different interpretations of what it meant. It seems that the students' interpretation of self-assessment converged towards attempting and practising activities; for some, it meant completing their homework, while for others it meant finishing their

classwork. For one group of students, self-assessment signified practising past examination questions, while another group claimed it was about searching for activities and working them out. Both Bronfenbrenner's (1979) model and Bourdieu's (1977, 1986) notions of habitus make sense of this finding. Bronfenbrenner (1979) and Bourdieu (1977, 1986) argue that variations in beliefs, knowledge and experiences are caused by contextual experiences at home and school. Thus, students would have different assessment literacy and capital based on their prior experiences. It could also be that the students' beliefs were evolving with time, and they interpreted their own perceptions when involved in the process of learning and assessment (Bourke, 2000; Bronfenbrenner & Morris, 2006).

According to Race (1991, as cited in Bourke 2000), self-assessment has two fundamental aspects: first, involving students in identifying and applying the learning intentions and success criteria to their work, and second, giving them opportunities to make judgements about whether they achieved those targets. However, in this study, the D&T teachers hardly shared and clarified the learning intentions and success criteria (as discussed in section 8.2.1). Accordingly, the students' various interpretations indicate that, possibly, the D&T teachers have not discussed the principles of self-assessment with the students. This assumption was consistent with the D&T teachers' views, discussed in section 8.2.1, where they did not allow students opportunities to engage in self-assessment, believing that the students were not skilled enough and that it would be a waste of teaching time (Schiro, 2013).

According to van Gennip et al. (2009), peer-assessment is an assessment method in which students play an active role in their learning. For Hennessy and Murphy (1999), D&T is "unique in involving procedural problem-solving activity where talk between peers relates to physical manipulation and feedback and both concrete models and graphical representations play an important mediating role" (p. 1). For example, one goal of peer assessors, when involved in D&T (and especially in project work), to provide feedback to peers on their tasks (Hovardas, Tsivitanidou, & Zacharia, 2014). Feedback can be in the form of critical judgement, indications of shortcomings and suggestions for improvement based on the aims of a particular task. However, the interview findings revealed that the students were not involved

in peer-assessment and seemed unaware of what the concept meant, despite undertaking the subject for the third year. Similar to self-assessment, students' understanding of peer-assessment may be related to their contextual experiences at home and school.

However, the D&T students believed that peer-assessment might help them in their learning, as they would be engaging with their peers. This finding is somewhat similar to Stanier's (1997) results, involving 36 undergraduate students at a university in England, in which the participants expressed their delight at being involved in peer-assessment because they believed their performance improved when they worked with others. The finding in this study showed how the 14-year-olds perceived interpersonal exchange of ideas in their learning, despite their teachers not promoting the idea of collaboration and peer-assessment.

This section answered the research question: What are the students' conceptions of 'assessment for learning'? The D&T students perceived 'assessment for learning' was to enhance students' learning, prepare students for tests and examinations and improve their teachers' practice (including their 'assessment for learning practices').

This chapter thus far has presented the findings that help to answer the four sub-research questions of this study. The following section discusses the results which help to answer the overarching research question.

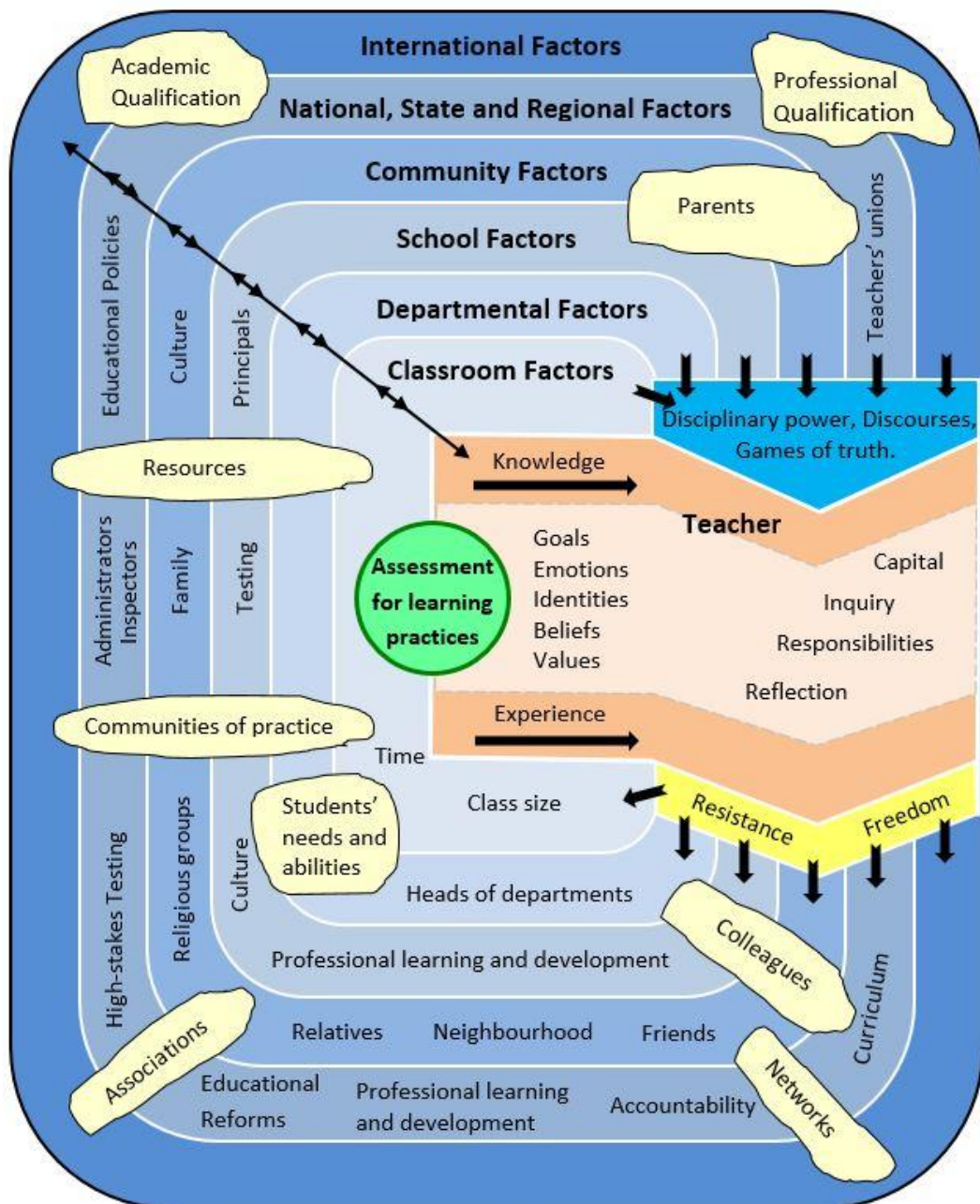
## **8.5 The Overarching Research Question**

The overarching research question—How are the 'assessment for learning' practices of Mauritius Design and Technology teachers framed?—provides the framework for the following discussion.

After examining the literature associated with the internal and external factors explaining how teachers' 'assessment for learning' practices were affected, it was evident that these could be conceptualised and compared with the D&T teachers' 'assessment for learning' practices to identify potential gaps. Accordingly, two models were conceptualised: first, one containing the possible internal and external

forces that would allow teachers to enact effective ‘assessment for learning’ practices (see Figure 8.1), and second, one reflecting the D&T teachers’ distorted ‘assessment for learning’ practices, further discussed in Figure 8.2.

The model in Figure 8.1 represents an amalgam of Bourdieu’s (1977, 1986, 2005) concept of habitus, Foucault’s (1982, 2002) explanations of the power-knowledge relationship and Bronfenbrenner’s (1979) ecological systems model. Other factors identified from a review of teachers’ knowledge, beliefs and practices, as others have done (Buehl & Beck, 2015; D. I. Cross & Hong, 2012; Patrick, Mantzicopoulos, & Sears, 2012; Woolfolk-Hoy, Davis, & Pape, 2006), and those emanating from the findings were included in the model.



*Figure 8.1* Internal and external factors that could possibly influence teachers' 'assessment for learning' practices to enact effective 'assessment for learning' practices

Figure 8.1 shows various layers of the education context, similar to Bronfenbrenner's model, where each layer has its own logic of practice. The model in Figure 8.1 consists of seven layers (internal and external factors), including teachers who have their individual sets of logic of practice (internal factors). Each layer consist of various elements, and some elements lie across various levels, such as resources and communities of practice. The arrows within the model signify the

reciprocal relationships between every layer that influence one another. These arrows also indicate that all the layers either directly or indirectly affect and shape teachers' goals, beliefs, emotions, values and identities (through disciplinary power, discourses and games of truth), which ultimately frame their 'assessment for learning' practices. In turn, the teachers, who receive education through teacher education programmes (professional qualifications), professional learning and development, and communities of practice and are empowered to define the goals of the schools and shoulder several responsibilities, also directly or indirectly influence the various layers of the model (through resistance and freedom). Through this education and empowerment, teachers experience a sense of belonging that motivates them to critique what should be done and how things should be done in their classrooms and departments based on their understandings.

The model in Figure 8.2, based on the findings from this study, highlights the contrasts between the ideal 'assessment for learning' practices (Figure 8.1). Figure 8.2 shows a much-reduced influence of numerous factors affecting and shaping the D&T teachers' 'assessment for learning' practices in Mauritius state secondary schools. The D&T teachers gained their academic and professional qualifications locally, were not provided professional learning and development in 'assessment for learning' and were not involved in communities of practice associated with 'assessment for learning'. Accordingly, the results suggest that these teachers' 'assessment for learning' practices were distorted based on their espoused beliefs, experiences and knowledge. Evidence also indicates that the teachers' 'assessment for learning' practices were affected by the internal (within their schools) and external (outside the school, such as the society) factors which emphasise preparing students for examinations rather than enhancing students' learning. The education (teacher education, professional learning and development, and communities of practice) and the internal and external influences did not empower, motivate the teachers to critique, and improve their practice (including 'assessment for learning').



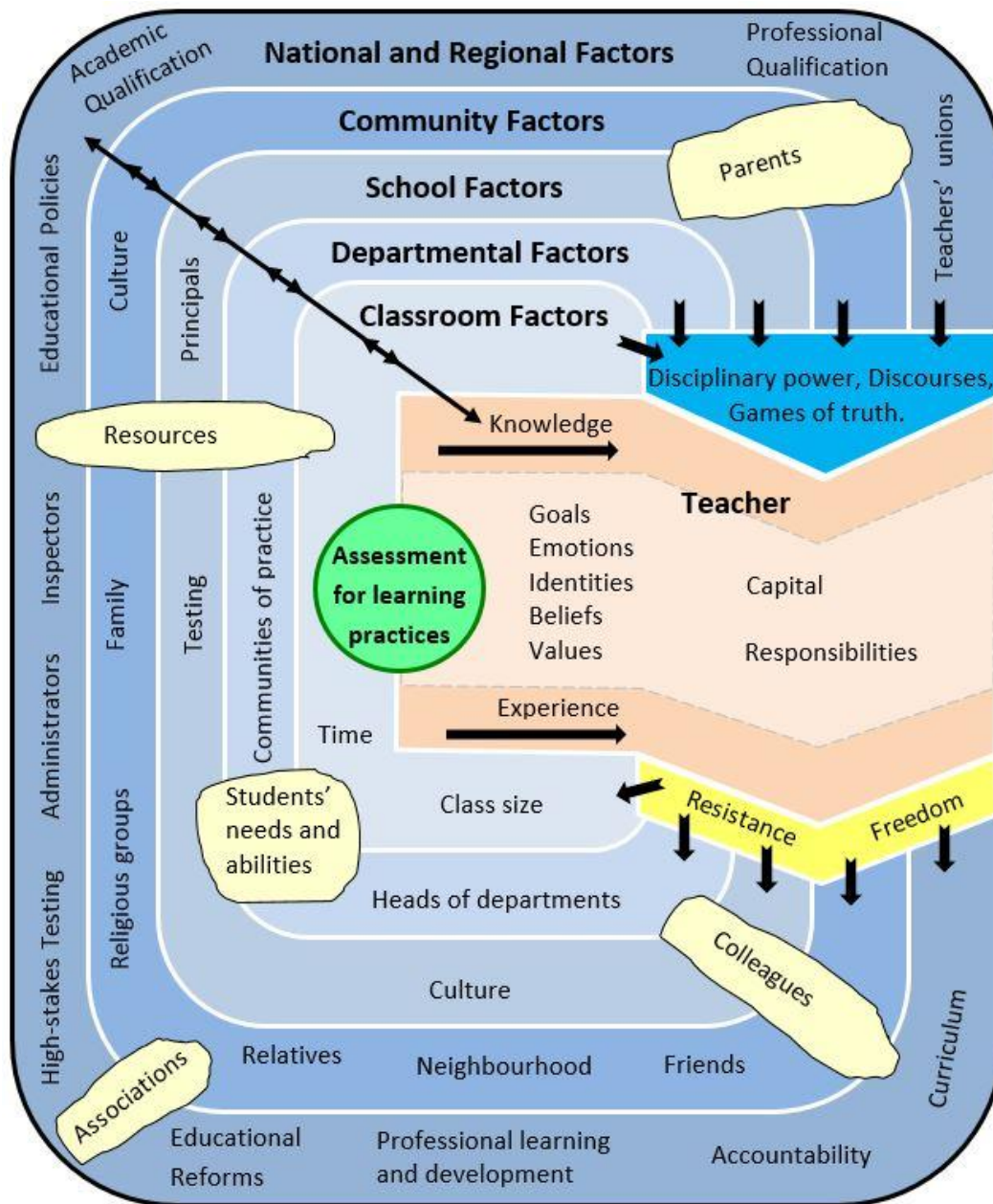


Figure 8.2 Internal and external factors that potentially shape D&T teachers' 'assessment for learning' practices in Mauritius

Teachers' 'assessment for learning' practices involve drawing on all assessment information gathered during classroom teaching, learning and assessment tasks and deciding if learners are experiencing difficulties in their learning (Klenowski, 2009; Klenowski & Wyatt-Smith, 2014; Warwick et al., 2015). At the decision level, teachers may intervene to scaffold learning, or guide students towards following the steps they need to take (and how they need to take them) in their learning (ARG, 1999). These decisions often involve discussions related to students' knowledge,

understanding and skills corresponding to learning targets (Brookhart, 2011b; Lauchlan, 2012; Moreland et al., 2008). Teachers also establish environments where students engage among themselves and move forward in their learning (Dann, 2014; Lau, Kwong, King, & Wong, 2014). Such engagement aligns with the sociocultural view of learning where meaning is created and shared between learners and their teachers (Bell, 2005; Pea, 1997; Zimmerman & Bell, 2012).

However, the results of this study suggest that the D&T teachers' 'assessment for learning' practices followed a mechanistic form of assessment (Absolum et al., 2009). The teachers' practices seem to follow the scholar academic ideology (Schiro, 2013), where they are considered to have a comprehensive understanding of their disciplines and practice. This could explain teachers' decisions for isolating learners from their peers and placing them in unfamiliar situations, and expecting them to use their experiences to solve design problems. Accordingly, the D&T teachers' assessment practices did not seem to focus on improving students' learning, but on task completion, where students received the same assessment tasks and are expected to perform them in similar conditions. Such 'assessment for learning' practices seem to align with behaviourist and cognitivist perspectives (Porcaro, 2011) where teachers' 'assessment for learning' practices mirror static assessment approaches. This teacher-led pedagogical tradition seemed to influence the D&T teachers' 'assessment for learning' practices.

The D&T teachers used various documents as guidelines when enacting 'assessment for learning'. The guidelines that dominated the teachers' 'assessment for learning' practices were the syllabus, textbooks, Cambridge International Examinations documents and school policy. These documents dictated the teachers' 'assessment for learning' practices mainly because they were accountable to the school, parents and students, who expected them to complete the syllabus and prepare students for examinations. However, the role of these documents, as Connelly and Connelly (2013) claim, is to guide teachers' practices and not de-professionalise their 'assessment for learning' practices. The school policy seemed to heavily shape the D&T teachers' 'assessment for learning' practices. What was apparent is that this guideline led teachers to conflate the various types of assessment. This conflation might have been the outcome of directions provided by

the school to the teachers, misunderstandings between teachers and principals or teachers' lack of foundational knowledge of assessment literacy (Popham, 2011).

Of concern was that the D&T teachers were not receptive to the curriculum. This lack of receptiveness may have been due to resistance to change, which might be associated with the teachers' habitus. However, leading causes, as McLaughlin (1987) puts it, seemed to be the D&T teachers' capacity and will. In other words, teachers' understanding of the curriculum, its roles and goals, as well as their beliefs or ideologies associated with learning and assessment might have led them to reject the curriculum policy and shape their 'assessment for learning' practices in particular ways. For example, what they should teach, how they should assess, and what and how students should learn (A. Moore, 2014).

An analysis of the key results suggest that the D&T teachers' 'assessment for learning' practices were shaped by various factors, such as their beliefs and practices (internal), and contexts (external). Teachers' espoused beliefs and practices are considered to be influenced by many aspects, such as knowledge, motivation, habitus, emotions and experiences (Bourdieu, 2002; Bronfenbrenner, 1979; Haney & McArthur, 2002). According to Fives and Buehl (2012), it is teachers' beliefs that determine the targets they set and effort they dedicate towards realising those targets. These choices may be governed by prior experiences and could transform into habits (Bourdieu, 1977). It is these teacher behaviours (effort, persistence and decisions) that determine the features of their 'assessment for learning' practices. Assessment literacy seems to be a fundamental factor that shapes teachers' beliefs and practices (Deneen & Brown, 2016). In this study, it is evident that the D&T teachers' 'assessment for learning' practices were significantly influenced by their beliefs and practices, which seemed not to be closely related to 'assessment for learning' literacy. However, it should be noted that contextual factors also affect teachers' beliefs and practices and that was apparent in this study.

Foucault's (1971, 1977, 1980, 1982) and Bronfenbrenner's (1979) concepts provide a valuable framework for conceptualising the contextual factors that seemed to frame the D&T teachers' 'assessment for learning' practices in this study.

Considering Foucault's (1977) concept of power-knowledge, it could be argued that the D&T teachers positioned themselves as docile bodies within a system where they reminded themselves that they were observed by their schools and the MOE. Thus, they adopted a particular 'assessment for learning' behaviour. Similarly, the results indicate that the D&T teachers' microsystem (i.e., principals, teachers, students and parents), mesosystem, exosystem (i.e., school board), macrosystem (i.e., society demands) and chronosystem framed their 'assessment for learning' practices (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). In short, it seems that both the internal and external factors framed the D&T teachers' 'assessment for learning' practices towards preparing students for examinations and positioning themselves for accountability purposes rather than enhancing students' learning and transforming their practice.

Students are a vital part of teachers' settings, and the literature indicates reciprocal interactions and influences on each others' beliefs and practices (Bronfenbrenner, 1979; Gebril & Brown, 2014). In this study, the findings suggest that the students seemed to influence the D&T teachers' 'assessment for learning' practices. It is obvious from the findings that the students' needs were framing the D&T teachers' assessment for learning' practices, such as, monitoring their activities, providing feedback in the form of answers, preparing them for tests and examinations, and using standard activities for the whole class.

## **Summary**

The chapter was sub-divided into five sections. The first four sections each synthesised the key findings of this study pertaining to the existing literature, which answered one sub-question. The last section presented an overall summary of the results to answer the overarching research question. The next chapter presents and discusses a review of the answers to the research questions and the conclusions drawn from these, implications for theory and practice, suggestions for further research, and strengths and limitations of the study.



# CHAPTER NINE

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## CONCLUSION

The purpose of this investigation was to explore Design and Technology (D&T) teachers' 'assessment for learning' practices in Mauritius state secondary schools. The study was centred on one research question:

- How are the 'assessment for learning' practices of Mauritius Design and Technology teachers framed?

The sub-questions stemming from the main question were:

- What are the teachers' 'assessment for learning' practices?
- What guidelines are the teachers using for their 'assessment for learning' practices?
- What are the teachers' rationales for implementing 'assessment for learning'?
- What are the students' conceptions of 'assessment for learning'?

To answer these questions, a constructivist epistemology, a social constructivist and poststructural theoretical framework, a naturalistic interpretative perspective and ethnographic methodology was adopted to understand the participants and their assessment practices in their natural settings. An embedded mixed methods design comprising three stages of data collection was implemented. A multi-method approach consisting of questionnaires, interviews, classroom observations, field notes and secondary documents was used to gather evidence that would help to answer the research questions.

This chapter is divided into five sections. To begin with, a summary of the answers to the questions and conclusions that can be drawn is provided. Following this, the implications for D&T teachers' 'assessment for learning' practices are discussed. Then, the strengths and limitations of the research design are presented. Finally, areas of further research are suggested, followed by a final comment.

## 9.1 Conclusions

The fundamental purpose of ‘assessment for learning’ is to enhance students’ learning and support them to become autonomous learners (J. Gardner, 2011a; Mumm, Karm, & Remmik, 2016). However, interviews and teachers’ classroom practices revealed that the D&T teachers’ ‘assessment for learning’ practices rarely served the fundamental purpose of ‘assessment for learning’. Accordingly, this section concludes with the key findings from this study.

It was evident from the teacher interviews and observations that the teachers did not consider the learners to possess self- and peer-assessment skills; thus, they deprived students of these assessment methods. Based on this finding, it can be deduced that the teachers considered their students to be like empty vessels, who learn by passively absorbing knowledge without engaging with the information and/or learning experience. So the teachers’ goals were mostly to transfer knowledge, and their feedback strategy was providing answers to questions and correcting mistakes. This indicates that the teachers followed a scholar academic and social efficiency ideology (Schiro, 2013). They considered themselves as mini-scholars responsible for transmitting knowledge to students, and fulfilling the need of the society by preparing students for tests and examinations, despite the Ministry of Education recommending a shift to a constructivist learner-centred ideology (MOEHR, 2006). The evidence from the student interviews and classroom observations suggests that students were willing to engage with their peers, but mainly did so outside the classroom.

This study has identified that instead of using ‘assessment for learning’ to promote students’ learning, the D&T teachers focused on technological content delivery and syllabus coverage, justifying their approaches by arguing that they had to prepare students for tests and examinations. It was apparent from the findings that the teachers did not engage according to the guidelines of the *National Curriculum Framework: Secondary* (NCFS) (MOEHR, 2009) to enact their ‘assessment for learning’ practices. This shows that the teachers adopted static assessment, rather than dynamic assessment, reflecting a leaning towards instructivism (Charles, 2014; Porcaro, 2011), rather than constructivism as advocated in the national curriculum.

It can be concluded that the examination-oriented education system and accountability policies dominated the D&T teachers' 'assessment for learning' practices.

It can be deduced that the D&T teachers had a weak understanding of 'assessment for learning' practices and some of them claimed that they did not need to reflect on and transform their practice (including 'assessment for learning' practices). Their lack of 'assessment for learning' knowledge led to confusion about the different purposes of assessment. Accordingly, their 'assessment for learning' practices were reduced to mechanistic checklists. It was evident that the teachers were continually repeating the same assessment practices, which is contrast to what research advocates as best practice in 'assessment for learning' (Klenowski, 2009; Warwick et al., 2015).

There was evidence that some teachers understood the sociocultural view of learning and fundamental concepts of 'assessment for learning', but were not putting these approaches into practice. It can be concluded that the teachers' educational contexts framed their beliefs about how learning occurs, and their 'assessment for learning' beliefs and practices. The results suggest that instead of being influenced by the 'assessment for learning' knowledge recommended by the NCFS (MOEHR, 2009) and those gained through their teacher education programmes, the teachers' own knowledge and experiences (Bourdieu, 1977, 2002; Bronfenbrenner, 1979) and dominant discourses within and across the educational contexts (Foucault, 1971, 2002) shaped their 'assessment for learning' beliefs and practices.

It can be concluded that teachers' 'assessment for learning' practices could be enhanced if the appropriate supports are provided to them. The findings suggest that some teachers were willing to improve their 'assessment for learning' practices, but ongoing and appropriate support in assessment is not provided. If the current trend continues, then the teachers' existing 'assessment for learning' practices will persist. The next section will discuss the implications for various stakeholders.



## 9.2 Implications for Education

The above conclusions have implications for the stakeholders, such as policymakers, teacher educators and teachers who are associated with D&T teachers' 'assessment for learning' practices.

A fundamental dimension of the national curriculum is the ideology underpinning its design. According to Schiro (2013), different curriculum ideologies embody different beliefs of how learners should be assessed. This study identified that teachers were not implementing the NCFS, which recognises that D&T requires a holistic and user-friendly approach to assessment, and learner-centred rather than teacher-directed assessment strategies (MOEHR, 2009). The teachers relied on their beliefs, knowledge and experiences when enacting their 'assessment for learning' practices and focused on preparing students for tests and examinations. For teachers to enact 'assessment for learning' corresponding to the dominant ideology of the policy document, it is therefore vital for teachers to engage with the NCFS. Accordingly, professional learning and development programmes for both teachers and principals need to complement the national curriculum.

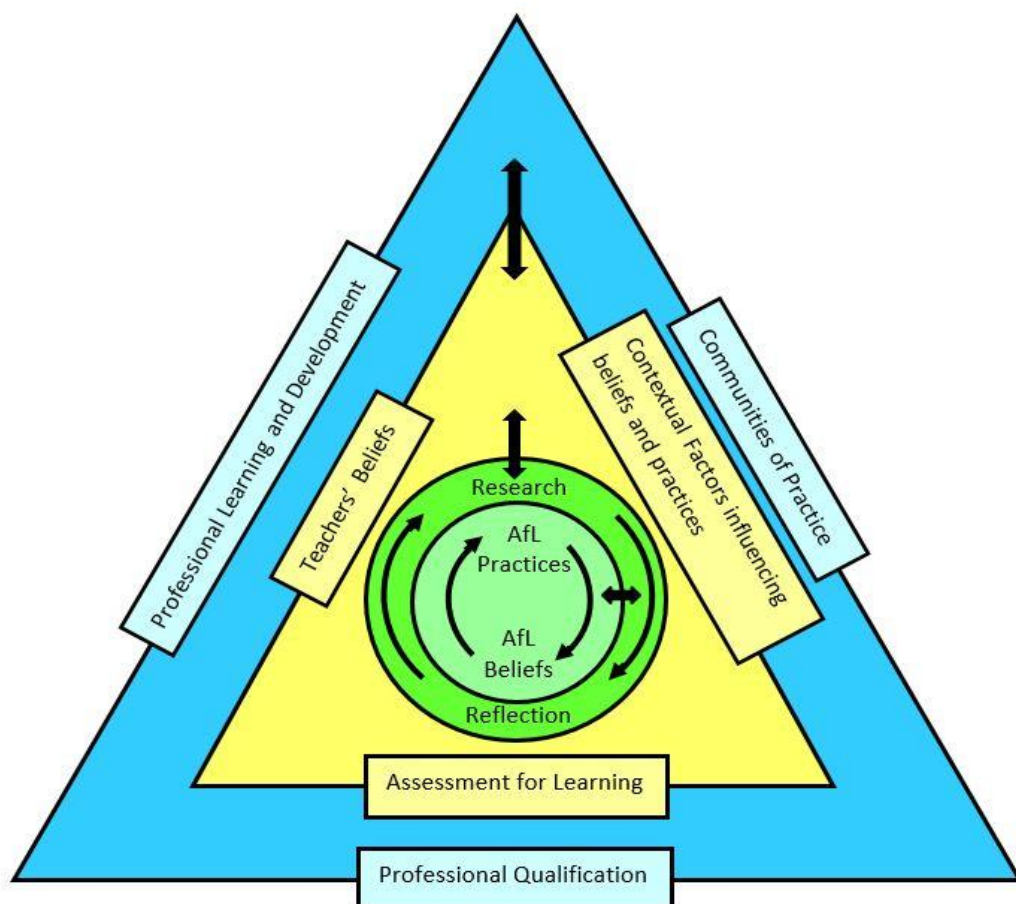
The intention of 'assessment for learning' is to promote students' learning. This study found several factors were distorting teachers' 'assessment for learning' practices, such as a lack of understanding of the concept, individual beliefs and practices, and factors within and across the educational settings. Therefore, there is an urgent need to develop teacher education programmes that support teachers with an understanding of concepts and theories related to 'assessment for learning', pedagogy, issues surrounding assessment and evidence of best practice in 'assessment for learning'. Additionally, teachers need to be provided with an understanding of the complicated and messy relationships between beliefs and practices, and influences of contextual factors. Furthermore, professional learning and development programmes in these areas should be developed for practising teachers (Adoniou, 2013).

Reflection-in-action, reflection-on-action and reflection-for-action are considered to lead to changes in and additions to beliefs, and an improvement of practice

(Killion & Todnem, 1991; G. Richardson & Maltby, 1995). If teachers' existing discourses, beliefs and practices are to be challenged, then they should be empowered to reflect on their 'assessment for learning' practices, which can be achieved through professional learning and development programmes (Marcos, Miguel, & Tillema, 2009). There is evidence that the teachers were not reflecting on their teaching and assessment practices. It could be that the teachers do not know how to reflect on their practices and/or reflect and seek alternative ways of assessing. For this reason, professional learning and development programmes related to assessment and reflection should be provided to teachers. To support teachers in their reflection, they should be empowered to reflect in social environments, such as collaborative research and communities of practice. Such interactions would also allow teachers to share their knowledge, experiences, good practice and problems corresponding to 'assessment for learning' and ultimately improve their practice.

Figure 9.1 represents the knowledge and understandings required by teachers to enact effective 'assessment for learning' practices, as identified in sections 9.1 and 9.2. It is presumed that if knowledge corresponding to 'assessment for learning', and understandings related to teachers' beliefs, and contextual factors influencing teachers' practices are provided, then teachers would be better equipped to enact effective 'assessment for learning'. These three areas are represented by the inner triangle of the model, with 'assessment for learning' at the base of the triangle since it is considered the foundation among the three. The model also illustrates that these concepts can be provided from three different platforms, such as teacher education (professional qualification), placed at the base of the triangle since it is regarded as the foundation among the three, professional learning and development, and communities of practice. Hence, these platforms have been represented by a larger concentric triangle. At the centre of the two triangles lie two concentric circles. The outer circle indicates that teachers should be involved in research and reflection related to 'assessment for learning' for them to continuously improve their practice. 'Assessment for learning' beliefs and practices are at the centre (inner circle) of the model because they signify that all the factors within the model would influence these elements. Arrows are also included to indicate that the different layers and factors affect each other.

The model illustrated in Figure 9.1 contributes to teachers' 'assessment for learning' practices as it conceptually justifies that providing only 'assessment for learning' literacy to teachers might not necessarily result in them enacting this new knowledge within their practice. This model is useful as it offers an overview of the fundamental aspects that are associated with teachers' 'assessment for learning' practices. It indicates that for teachers to enact effective 'assessment for learning' practices within an education system which is highly examination-oriented or where teacher-led pedagogical traditions dominate, teachers need to be continuously supported to develop an understanding of 'assessment for learning' and the factors influencing its enactment. Effective enactment of 'assessment for learning' practices would certainly result in better students' learning, meaning that their performance in both internal and external tests and examinations would be enhanced. However, the level of emphasis required on each aspect represented in the model will be context dependent.



*Figure 9.1* The fundamentals that could improve teachers' 'assessment for learning' beliefs and practices

### **9.3 Strengths and Limitations of the Research Design**

The research design of this study, like most studies, has strengths and limitations. One main strength was the use of mixed methods to inform the research and answer the complex research problem (Fraenkel et al., 2012) corresponding to D&T teachers' 'assessment for learning' practices. The use of an embedded design within a qualitative approach has provided a comprehensive and accurate picture of teachers' 'assessment for learning' practices (Creswell & Plano Clark, 2011; Punch & Oancea, 2014).

Another strength was the use of ethnography as a methodology to understand teachers' practices. Ethnography allowed investigation and description of D&T teachers' 'assessment for learning' practices by concentrating on their everyday behaviours, which were obtained through interviews and observations (Fetterman, 2010). Data gathering by watching the participants, asking questions through formal and informal interviews and collecting artefacts allowed an in-depth understanding of teachers' 'assessment for learning' practices to be gained (Hammersley & Atkinson, 2007). Since time was spent with the observed participants in the field, verbal exchanges with them aided clarification of their meanings. The group interviews resulted in rich data as it encouraged participants, who were not accustomed to describing their practice, to be involved in productive conversations that led to understanding their espoused beliefs and practices (Fontana & Prokos, 2007).

This research was restricted to the context of Mauritius where data were collected from a small sample of D&T state secondary school teachers; therefore the results may not necessarily be generalised to other settings. However, with the involvement of teacher participants from 11 out of 38 state secondary schools, from both rural and urban areas, a rich description of D&T teachers' 'assessment for learning' beliefs and practices was obtained. The findings provide insights into D&T teachers' assessment practices in Mauritius, but are not generalisable beyond this context. Thus, teachers and researchers will be able to judge if the findings and conclusions are relevant and resonate with their own country's practices.

One major limitation was the timing of data gathering. Observations were carried out during the first and second terms of the school calendar, and unexpectedly the teachers were involved with ‘assessment for learning’ corresponding to the component of ‘graphic products’. Thus, a complete understanding of the teachers’ ‘assessment for learning’ practices in other components of D&T, such as ‘product design’ and ‘practical technology’ was not possible and may have affected the results.

Another possible limitation are my own prejudices from having been a teacher. For instance, owing to my professional background and familiarity with the research sites and participants, the data produced may have been influenced. My knowledge and experience might have pushed me towards taking certain things for granted or making the participants self-conscious of specific issues (J. Mercer, 2007). Accordingly, I was mindful of gathering and validating the data using a variety of methods. I checked my understanding of the data by asking all the participants to approve the interview transcripts and by having informal conversations and interviews with participants who were observed (Lincoln & Guba, 1985). Still, since the data collection process involved interviewing several student participants using Mauritian Creole, as a researcher, I might have influenced the data when translating into English. To lessen such bias, I carefully discussed the data with the participants (Lodico et al., 2010) and had a translator to verify the transcripts.

## **9.4 Recommendations for Further Research**

This research indicated that the D&T teachers were not receptive of the NCFS and did not use it as a guideline for their assessment practice. The teachers disregarded the goals, forms of assessment and learner-centred ideology of the policy document (MOEHR, 2009). Therefore, there is a need for in-depth investigations into how teachers use and assess the curriculum. Since a revised national curriculum has recently been released, it will be useful to investigate if teachers engage with the document and change their ‘assessment for learning’ practices, particularly when the national examination for 14-year-olds has been extended to all subjects (MOEHR/TER, 2015b, 2016). Additionally, it would be of interest to investigate teachers’ ‘assessment for learning’ practices at lower secondary because the results

of this national examination would be used to admit students into the 12 prestigious upper secondary schools (MOEHRTESR, 2016).

In spite of the various guidelines that the teachers used, the study found that teachers had a narrow understanding of ‘assessment for learning’ and seemed confused about the various assessment purposes. Accordingly, an investigation of teacher educators’ and principals’ ‘assessment for learning’ literacy within the Mauritian context would be useful.

Although this study involved a relatively small sample, it raises questions about whether D&T teachers in other schools in Mauritius, such as state secondary, private-aided and private non-aided, have similar ‘assessment for learning’ beliefs and practices. Hence, additional research may be required to investigate D&T teachers’ ‘assessment for learning’ practices at different schools, and levels, and in other components of D&T (i.e., such as ‘product design’ and ‘practical technology’) as well as in other subjects/curriculum areas.

Research shows that teachers need to be supported by professional learning and development and be involved in communities of practice in several areas, such as beliefs, contextual factors and ‘assessment for learning’ literacy (Barnes et al., 2015; Koh, 2011; Poskitt, 2014). Based on the findings of this study, it is recommended that teachers should reflect and be involved in research. Hence, research might be conducted to investigate how teachers’ ‘assessment for learning’ practices develop over time when sustained with professional learning and development, and communities of practice, and when involved in reflection and research.

This study indicated that D&T teachers’ ‘assessment for learning’ knowledge is limited, possibly indicating that teacher education in the area of D&T lacks the appropriate structure and knowledge to guide and support teachers’ ‘assessment for learning’ practices. Thus, a comparative study of ‘assessment for learning’ content of the D&T teacher education programme of Mauritius with other comparable countries would be helpful as it could indicate areas of improvement in structure and content.

## 9.5 Concluding Comment

This study is believed to be the first in Mauritius to investigate D&T teachers' 'assessment for learning' practices. My personal experiences inspired this research as a teacher educator and previously a D&T secondary school teacher. The study aimed to explore D&T teachers' 'assessment for learning' practices in Mauritius state secondary schools, and the outcome will contribute to new knowledge in the field both nationally and internationally.

The findings indicate that D&T teachers in Mauritius are not using evidence from research to improve their teaching and enhance students' learning. One primary concern is that experienced and qualified teachers do not readily change their beliefs and practices. Despite the introduction of a new curriculum and the urge (by the MOE) to adopt learner-centred approaches to assessment in Mauritius, D&T teachers are still focusing on syllabus coverage, drilling students to sit for end-of-year examinations and using traditional assessment approaches.

This research study provided insights into the variables that affect D&T teachers' 'assessment for learning' practices. The results reveal that D&T teachers' 'assessment for learning' practices were framed by a combination of factors, including their pedagogical backgrounds, experiences and beliefs, school policies and procedures, and forces external to the institutions. Thus, it can be concluded that "we cannot transform the conditions of education on the inside if we do not transform those on the outside, and we cannot transform conditions of education on the outside if we do not transform those on the inside" (Harkins, 2013, p. 193). In short, an inside-outside transformation of the conditions of education is required for 'assessment for learning' to serve its real purpose. This study has contributed to understanding both the internal and external factors that need attention if the aspirations of the national curriculum are to be realised.

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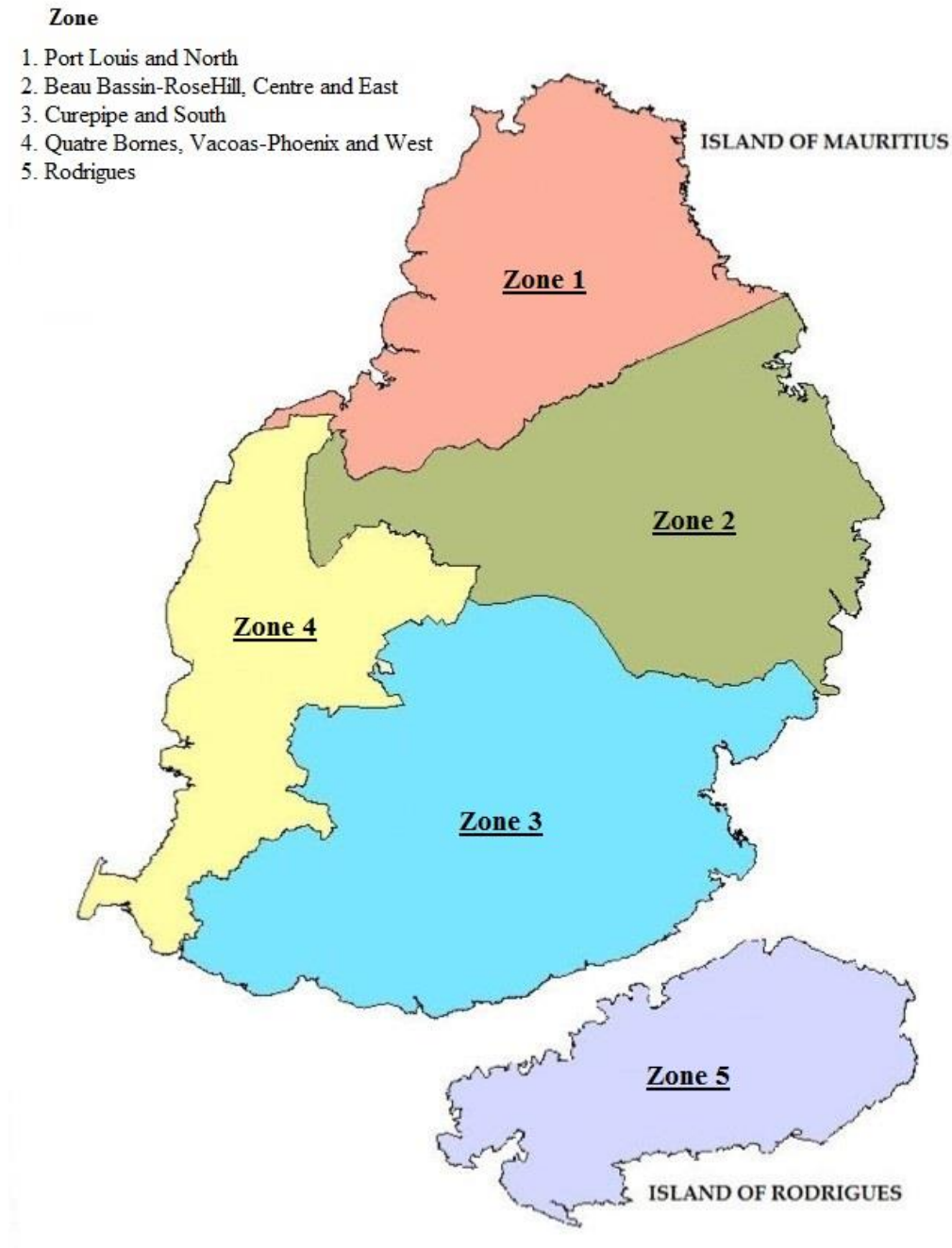
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## APPENDICES

### Appendix A: Educational Zones of the Republic of Mauritius

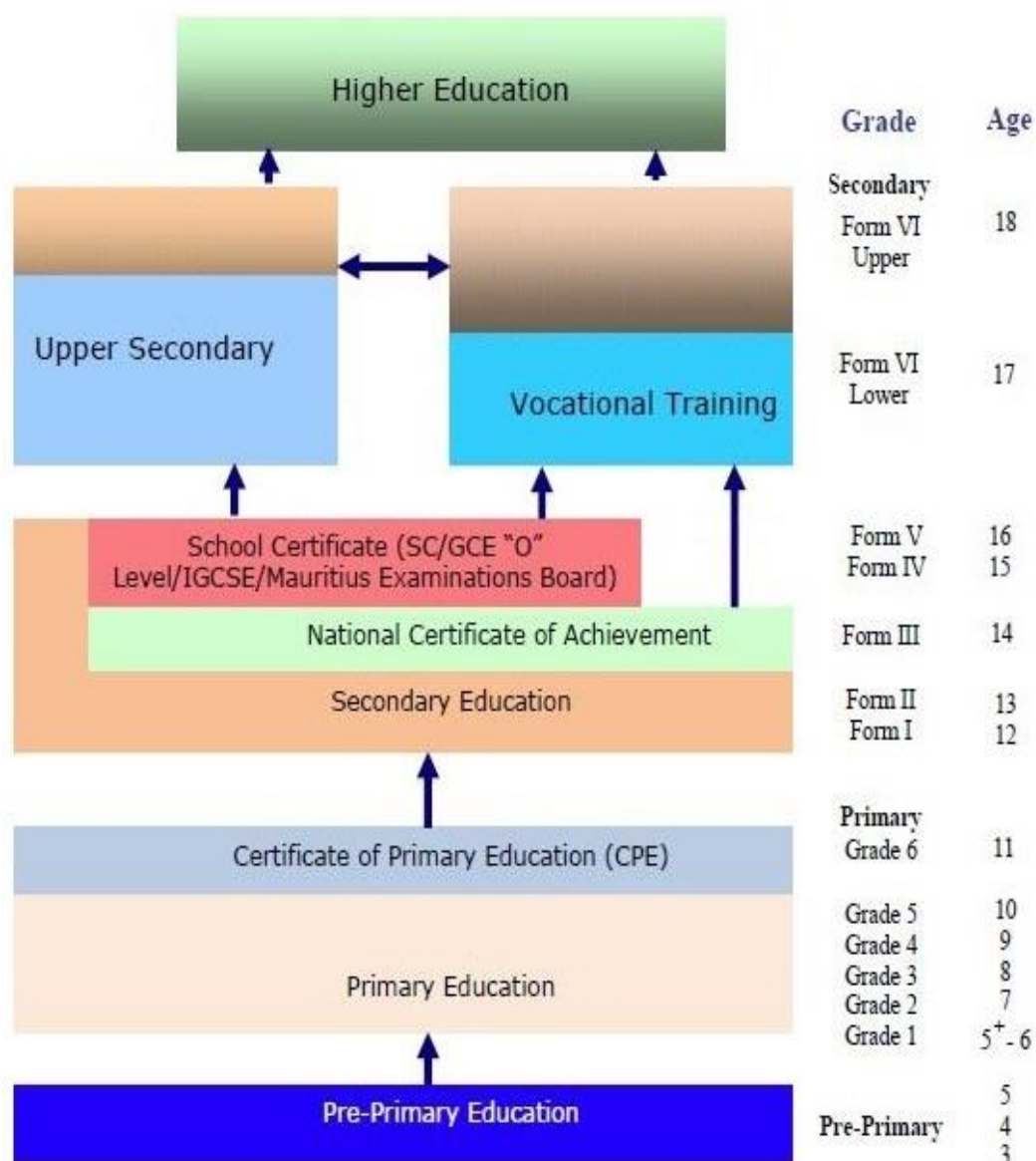


*The distribution of educational zones in the Republic of Mauritius.*

*Note.* Adapted with permission from *Education Card 2013* (p. 2), by the Ministry of Education and Human Resources, Tertiary Education and Scientific Research, 2013, Phoenix, Mauritius: Author. Copyright 2013 by MOEHRTESR.

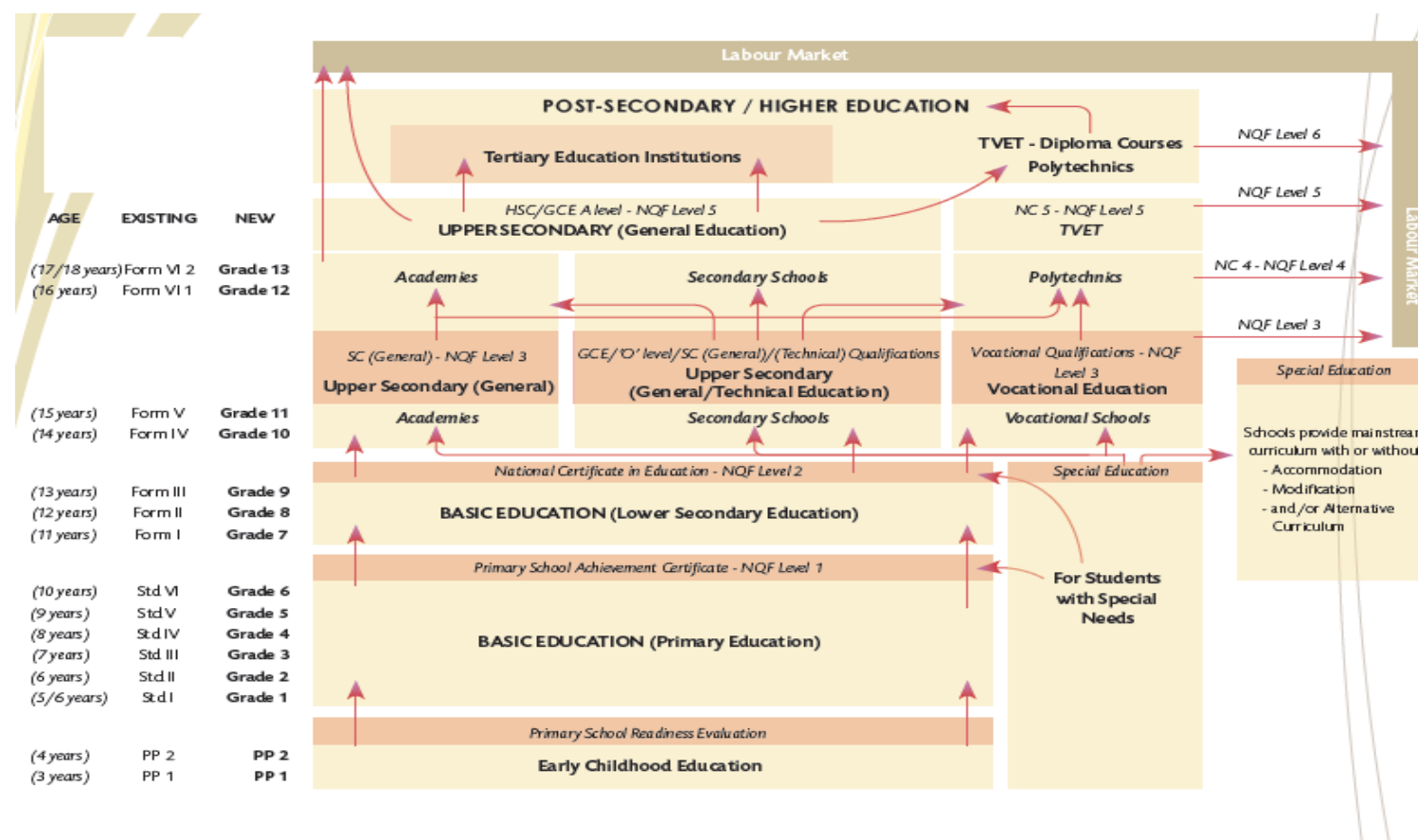


## Appendix B: Structure of Education as from 2011



*Note.* Adapted with permission from *Education and Human Resources Strategy Plan 2008-2020* (p. 26), by the Ministry of Education, Culture and Human Resources, 2009, Phoenix, Mauritius: Author. Copyright 2009 by MOEHRTESR.

## Appendix C: Structure of Education: Nine-year continuous basic education as from 2017



Note. Reprinted with permission from *National Curriculum Framework: Nine-Year Continuous Basic Education* (p. 6), by the Ministry of Education and Human Resources, Tertiary Education and Scientific Research, 2015c, Phoenix, Mauritius: Author. Copyright 2015 by MOEHRTESR.

## Appendix D: Questionnaire

You are requested to fill this questionnaire to provide the researcher with some background information about yourself. Follow the instructions for each question and write your responses in the spaces provided.

1. Surname: .....
2. Other names: .....
3. Which of the following categories includes your current age? (Tick the appropriate box.)

21- 25	26 - 30	31- 35	36 - 40	41- 45	46 - 50	51- 55	56-60	60- 65

4. Are you working in more than one school? (Tick the appropriate box.)

Yes	No
-----	----

5. List the school (s) at which you are teaching in 2016. (Please mention the days if you are at more than one school).

- i. ....
- ii. ....

6. List the subjects you studied at SC level. Year:

(.....)

- |           |            |
|-----------|------------|
| i. ....   | v. ....    |
| ii. ....  | vi. ....   |
| iii. .... | vii. ....  |
| iv. ....  | viii. .... |

7. List your main subjects at HSC level. Year: (.....)

- i. ....; ii. ....; iii. ....

8. What are your qualifications above HSC? (Please start with the most recent.)

- i. Year (.....): .....
- ii. Year (.....): .....
- iii. Year (.....): .....

9. List the workshops/training/seminars/programmes you attended, if any, in the area of assessment. (Please start with the most recent.)
- i. Year (.....): .....
- ii. Year (.....): .....
10. Other workshops/training/seminars/ programmes attended, if any, in the last 15 years. Do not include those mentioned above.
- i. Year (.....): .....
- ii. Year (.....): .....
11. Number of years of work experience: .....
12. Number of years of teaching experience: .....
13. Number of years of teaching experience in private secondary schools: .....
14. Number of years of teaching experience in private-aided secondary schools: ....
15. Number of years of teaching experience in state secondary schools: .....
16. Have you been the Head of Department of D&T before? (Tick the appropriate box.)

Yes	No
-----	----

If yes, for how many years? .....

17. Are you the Head of Department this year (2016)? (Tick the appropriate box.)

Yes	No
-----	----

18. Are you currently teaching Form 3 classes? (Tick the appropriate box.)

Yes	No
-----	----

If yes, how many Form 3 classes do you have? .....

**Kindly note that I will collect the questionnaire on the day we have the group interview. Thank you for your time.**

## Appendix E: Teacher Interviews Questions

Prompts were used when clarification was required.

1. What do you understand by the term ‘assessment’?

2. Why do you conduct ‘assessment for learning’?

3. How do you conduct ‘assessment for learning’?

*Prompts: Can you elaborate a little more? Give me an example how you do it.*

4. What guidelines do you use to plan for ‘assessment for learning’?

*Prompts: Which document do you consult to prepare for AfL? Do you use any other guidelines?*

*Do you use any specific guidelines when implementing AfL or formative assessment? Can you elaborate on the assessment/AfL guidelines that the school provides? Do you refer to the NCFS? Can you elaborate a little more? Do you consider classwork and homework as assessment?*

5. What planning do you do before entering the classroom?

*Prompts: How about AfL planning? Any other forms of planning? Give me an example how you do it. How about scheme or weekly or lesson plans? Exams at which levels? Is the same test given to all the form three classes?*

6. When do you communicate the learning outcomes to students?

*Prompts: Can you elaborate a little more?*

7. What factors do you take into consideration when planning for AfL?

*Prompts: What type of assessment are you referring to? Can you elaborate a little more? How about when you give classwork and homework?*

8. What ‘Assessment for Learning’ approaches do you use?

*Prompts: You give marks also?*

9. What information do you collect during and after teaching sessions?

*Prompts: Do you record this information? Where do you record the information? Give me an example how you do it.*

10. How do you make use of the collected information?

*Prompts: You mean the marks help them in their learning? Where do you write these notes? Do you have any document for your own records?*

11. How do you provide feedback to students?

12. Why do you provide feedback to students?

13. What professional development courses/workshops/seminars are helping you to plan and implement ‘Assessment for Learning’?

*Prompts: Can you please elaborate?*

14. Is there anything you would like to add about assessment or AfL?

*Prompts: Can you please elaborate; Any guideline that recommends conducting specific number of tests per term?*

## Appendix F: Student Interviews Questions

Prompts were used when clarification was required.

1. What do you understand by the term ‘assessment’?
2. Why do teachers conduct ‘assessment for learning’?
3. How do you prepare for ‘assessment for learning’?  
*Prompts: Can you please elaborate?*
4. How does ‘assessment for learning’ help improve your performance?
5. How do you react if different activities are provided to different students?
6. How do you react if different tests are given to various groups of students?
7. What do you do when you face difficulties working out classroom activities (classwork and homework)?  
*Prompts: Can you give some examples? Please, tell us more about teaming up with peers.*
8. Why do you think that peer and self-assessment should be encouraged?  
*Prompts: Can you please elaborate a little bit more?*
9. How do you perform self-assessment?  
*Prompts: Can you please elaborate?*
10. Why does your Design and Technology teacher provide feedback to students?  
*Prompts: Can you please elaborate a little bit more?*
11. What do you do when your Design and Technology teacher provides feedback to you?  
*Prompts: Can you please elaborate?*

## Appendix G: Observation Sheet

Teacher number: ..... Observation number: ..... Topic: ..... Date of Observation: .....

Minute	Learning Intentions	Success Criteria	Questioning	Discussion T-S	Activities		Teacher Monitor learning	Teacher Feedback	Self. A	Peer. A	Students collaborate	Comments and Coding from Rubric (E.g., 1A5, 2D4, ...)
					Set	Correct						
0 - 5												
6 - 10												
11 - 15												
16 - 20												
21 - 25												
26 - 30												
31 - 35												
36 - 40												
41 - 45												
46 - 50												
51 - 55												
56 - 60												
61 - 65												
66 - 70												
71 - 75												
76 - 80												

T-Teacher; S- Student, G-General, Grp-Group, I- Individual; PS-Prompt students; TPQ- Teacher prepared questions; TBQ- Textbook questions; TRSP- Teacher records student's progress; Activities: CW-Classwork, HW- Homework.

## Appendix H: Observation Rubrics

**1. Learning Goals:** Learning Goals should be clearly identified and communicated to students, and should help students make connections among lessons within a larger sequence. This dimension focuses on how the teacher identifies the learning goals for a particular lesson and communicates and uses them to the students in a way that supports learning. Research suggests that when students understand the intended learning of a lesson they are better prepared to engage with the content and learning is positively impacted.

At the lower ends of the rubric, learning goals are not used, or are used in a pro forma manner, while at the higher levels learning goals are integrated into the lesson and support student learning.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The lesson is presented in isolation with no connections made to previous or future learning	1	The lesson is presented with only isolated references made to previous or future learning.	1	The lesson is clearly presented in terms of previous or future learning. A larger sequence of learning is identified and the teacher shares where the current lesson fits within the larger sequence.	1	The lesson is presented as part of a coherent sequence of learning with meaningful connections made to previous or future learning in a way that students clearly understand the connections.
2	Superficial procedural connections are made such as “we started this yesterday” or “we’ll wrap this up tomorrow”.	2	The learning goal focuses on what students should know or understand by the end of the lesson. The content of the learning goal is appropriate for students and is expressed in language that is accessible to students.	2	Same as 1B2	2	Same as 1B2
3	The teacher does not present learning goals to students in any form.			3	The teacher presents the learning goal by writing the goal for the lesson on the board and makes verbal or direct reference to the learning goal at the start of the lesson.	3	The teacher presents the learning goal by writing the goal for the lesson on the board and makes meaningful and appropriate reference to the learning goal at the start of the lesson.
4	The teacher only presents an agenda for the day or lesson activities. The content of the learning goals is highly inappropriate for the students (the content is too challenging or too easy for students current standing, or does not align with the standard).	3	The teacher presents the learning goal by writing the goal for the lesson on the board but makes no verbal or direct reference to the learning goal at the start of the lesson.	4	The teacher makes some reference back to the learning goals towards the end of the lesson, but not in a way that necessarily deepens student understanding.	4	The teacher makes multiple meaningful and appropriate verbal references to the learning goal throughout the lesson in ways that support student learning or summarises progress towards the goals at the end of the lesson.
5	The learning goals are expressed in language that is not accessible to students (e.g., uses language of the state standards only)	4	The teacher does not return to the learning goals in a meaningful way throughout the lesson.				



**2. Criteria for Success:** Criteria for Success should be clearly identified and communicated to students. This dimension focuses on how the teacher identifies the criteria for success for a particular lesson and communicates them to the students. Research suggests that when students understand what quality work actually looks like they are more able to demonstrate their own learning. In this rubric, the focus is primarily on the sharing of explicit expectations (e.g., rubrics, preflight checklists, exemplars, etc.) that communicate quality.

At the lower ends of the rubric, criteria for success are not used or are used in a pro forma manner, while at the higher levels criteria for success are integrated into the lesson, are accessible to students, and support student learning.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The teacher does not provide criteria for success OR	1	The teacher shares criteria for success with students.	1	Same as 2B1	1	Same as 2B1
2	The criteria for success are not appropriate for the learning goals or are not appropriate for students (too basic/complex). OR	2	The criteria for success are appropriate for the learning goals and for students (not too basic/complex) and expressed in language that is accessible to them.	2	Same as 2B2	2	Same as 2B2
3	The criteria for success are expressed in language that is not accessible to students.	3	The teacher does not provide a way for students to internalise the criteria/use the criteria effectively (e.g., develop the criteria themselves, explanations, time or support to use them) resulting in no students engaging with the criteria in meaningful ways.	3	The teacher provides a way for students to internalise the criteria/use the criteria effectively (e.g., develop the criteria themselves, explanations, time or support to use them), but not all students seem to understand or engage with the process.	3	The teacher provides a way for students to internalise the criteria/use the criteria (e.g., develop the criteria themselves, explanations, time or support to use them) effectively. The process ensures that students engage with the criteria in meaningful ways that support learning throughout the lesson (e.g., skilful and appropriate use of exemplars, students developing rubrics). This results in the majority of students engaging in and benefiting from the process.

**3. Tasks and Activities that Elicit Evidence of Student Learning:** Teachers need to use a range of tasks and activities to collect relevant evidence of student thinking. When students are engaged in tasks and activities (on their own, with another student, or in a small group) the work products provide evidence of student understanding. In order to be effective, students need to have access to appropriate support from either the teacher or from peers to complete the task. In addition, the teacher needs to have a mechanism for synthesising evidence from students, whether through a formal review process or informal on-the-fly review.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The teacher uses tasks or activities that are not connected to the learning goals or will not provide evidence of student progress towards those goals.	1	The teacher uses tasks or activities that are loosely connected to the learning goals and will provide limited evidence of student progress towards those goals.	1	The teacher uses well-crafted tasks and activities that are connected to the learning goals and will provide evidence of student progress towards those goals.	1	The teacher uses well-crafted tasks and activities that are tightly connected to the learning goals and will provide evidence of student progress towards those goals.
2	Most students are unclear about the task and time is wasted because extensive re-explanations are needed.	2	Many students are unclear about the task and some time is wasted because re-explanations are needed.	2	A few students are unclear about the task and time is used inefficiently because re-explanations are needed.	2	Almost all students are clear about the task and are able to begin work efficiently.
3	The teacher does not review student work products during the lesson or does not make any reference to when they will be reviewed.	3	The teacher occasionally or haphazardly reviews student work products during the lesson or makes a vague reference to when they will be reviewed.	3	The teacher reviews student work products during the lesson in a way that provides insight into most students' progress or makes a reference to how work products will be reviewed later	3	The teacher systematically reviews student work products during the lesson in a way that provides insight into all students' progress or makes a concrete reference to how they will be reviewed.
4	The evidence collected cannot be used to make meaningful inferences about the class's progress on intended learning outcomes and to adapt/continue instruction.	4	The teacher misses multiple critical opportunities to make inferences about student progress and/or adapt/continue instruction accordingly.	4	The teacher occasionally misses critical opportunities to make inferences about student progress and adapt/continue instruction accordingly.	4	The teacher uses student responses to make inferences about student progress and adjust/continue instruction accordingly.

**4. Questioning Strategies to Elicit Evidence of Student Thinking:** Teachers need to use a range of questioning strategies to collect relevant evidence of student thinking, from more students, more often, and more systematically. Often teachers ask questions only to a few interested students, answer their own questions, or limit student thinking by the type of questions asked. If a teacher has weak questioning strategies, s/he loses opportunities to gain valuable insights into student learning.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The teacher asks very few questions designed to assess student progress.	1	The teacher asks some questions at appropriate points to assess student progress.	1	The teacher asks questions at appropriate points to assess student progress.	1	Same as 4C1
2	The teacher provides inadequate wait time and/or often answers her own questions.	2	The teacher inconsistently provides adequate wait time to allow all students to engage with the questions. The teacher sometimes answers her own questions.	2	The teacher provides appropriate wait time to allow all students to engage with the questions.	2	Same as 4C2
3	The teacher uses questioning strategies that provide evidence from only a few students or the same students in the class.	3	The teacher inconsistently uses questioning strategies to collect evidence of learning from more students (e.g. whiteboards, exit tickets, etc.) but implementation may not be consistent or structured in a beneficial way.	3	The teacher uses effective questioning strategies to collect evidence of learning from all students in systematic ways (e.g. whiteboards, exit tickets, etc.)	3	Same as 4C3
4	The evidence collected cannot be used to make meaningful inferences about the class's progress on intended learning outcomes and to adapt/continue instruction.	4	The teacher misses multiple critical opportunities to make inferences about student progress and/or adapt/continue instruction accordingly.	4	The teacher occasionally misses critical opportunities to make inferences about student progress and adapt/continue instruction accordingly.	4	The teacher uses student responses to make inferences about student progress and adjust/continue instruction accordingly.

**5. Feedback loops during questioning:** Students should be provided with ongoing feedback that helps them develop ideas and understanding of the content. This dimension focuses on the teacher’s role to provide ongoing feedback during class discussions.

The full observation protocol includes three dimensions that address distinct aspects of feedback: Individualized Descriptive Feedback, Feedback Loops, and Peer Assessment. This dimension is specific to more informal feedback that often occurs in real-time during a lesson.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The teacher asks very few questions during the lesson designed to encourage classroom discussion	1	The teacher asks questions at a few points during the lesson designed to encourage classroom discussion.	1	The teacher asks questions designed to encourage classroom discussion at multiple points during the lesson.	1	The teacher asks questions designed to encourage classroom discussion consistently throughout the lesson and integrates questioning and discussion seamlessly into instruction.
	OR	2	The teacher only occasionally builds on student responses or encourages students to build on each other’s responses.	2	The teacher and other students frequently build on other students’ responses, clarifying student comments, pushing for more elaborate answers, or engaging more students in thinking about the problem.	2	The teacher and other students consistently build on other students’ responses, clarifying student comments, pushing for more elaborate answers, or engaging more students in thinking about the problem.
2	The teacher asks questions from students, but discussion focuses on a statement of correct or incorrect rather than deeper/meaningful exploration of ideas.	3	There are occasional feedback loops, although they are short and often end abruptly and do not allow a full exploration of ideas and concepts.	3	Feedback loops sustain the conversation, rarely end with the teacher indicating correct or incorrect responses, and allow for deeper /more meaningful exploration of some ideas (basketball discussion, hot seat questioning).	3	Extended feedback loops are used to support students’ elaboration and to have students contribute to extended conversations. Classroom discourse is characterised by the consistent use of feedback/probes that encourage deeper/ more meaningful exploration of ideas (basketball discussion, hot seat questioning).

**6. Individualised Descriptive Feedback:** Students should be provided with evidence-based feedback that is linked to the intended instructional outcomes and criteria for success. This dimension focuses on the teacher’s role to provide individualised feedback to students. Research suggests that student learning improves when students are provided with descriptive feedback that is connected to clear targets and that provides guidance on how to improve work.

The full observation protocol includes three dimensions that address distinct aspects of feedback: Individualised Descriptive Feedback, Feedback Loops, and Peer Assessment. The Individualised Descriptive Feedback dimension is specific to more formal feedback that tends to be given to individual students on a specific piece of work, either in written form or orally (e.g., during student/teacher conferences) by the teacher.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The teacher provides no descriptive feedback	1	The teacher provides descriptive feedback (written or individualised oral feedback to younger students) on a specific piece of work without a score or a grade that supports the learning goals and/or reflects the criteria for success.	1	Same as 6B1	1	Same as 6B1
2	The teacher provides descriptive feedback (written or individualised oral feedback to younger students) on a specific piece of work but also includes a score or a grade.	2	Same as 6A4	2	Students are provided with opportunities to internalise the feedback (review the feedback and/or ask questions).	2	Same as 6C2
3	Feedback seems disconnected to intended learning goals.	3	There is no opportunity for students to use the feedback or apply it to their work in meaningful ways (apply it to the current or next work/activity).	3	Same as 6B3	3	Students are provided with opportunities to use the feedback or apply it to their work in meaningful ways (apply it to the current or next work/activity).
4	There is no opportunity for students to internalise the feedback (review the feedback and/or ask questions).						
5	There is no opportunity for students to use the feedback in a meaningful way (apply it to the current or next work/activity).						

**7. Peer-Assessment:** Peer-assessment is important for providing students with an opportunity to think about the work of their peers. Research suggests that opportunities to review the work of a peer and to provide feedback are very beneficial to the person providing the feedback.

The full observation protocol includes three dimensions that address distinct aspects of feedback: Individualised Descriptive Feedback, Feedback Loops, and Peer Assessment. This dimension includes the role of student-to-student feedback, while various approaches to teacher feedback are addressed in Feedback Loops and Individualised Descriptive Feedback.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	Students are not provided with any opportunity to engage in the assessment of their peers' work.	1	The teacher asks students to assess a peers' work and provide feedback to improve the quality of the work.	1	Same as 7B2	1	Same as 7B2
	OR	2	The peer-assessment task does not appear to be meaningful to most students (students do not take the task seriously or perceive value in the task).	2	The peer-assessment task appears to be meaningful to most students.	2	The peer-assessment task appears to be meaningful to all students.
2	Students are asked to mark their own work for a summative grade.	3	The peer-assessment task lacks structure and does not support students (e.g. students do not understand the task, the task was not modelled, no exemplars of feedback are provided). Most students struggle to complete the peer- assessment and cannot provide feedback that supports learning.	3	The peer-assessment task is structured in a way (e.g. the task was modelled for students, exemplars of feedback are provided) that supports some students to complete the peer- assessment and provide feedback that supports learning but the support may not be adequate for all students.	3	The peer-assessment task is structured in a way (e.g. the task was modelled for students, exemplars of feedback are provided) that supports all students to complete the peer- assessment and provide feedback that supports learning.
		4	The peer-assessment does not have an impact on the quality of student work due to the quality of the feedback or lack of structure for using the feedback (time to read and revise).	4	The peer-assessment has a limited impact on the quality of student work due to the quality of the feedback or structures for using feedback (time to read and revise).	4	The peer assessment has a positive impact on the quality of all student work due to the high quality of the feedback and structures put in place for the use of the feedback (time to read and revise).

**8. Self-Assessment:** Self-assessment is important because it provides students with an opportunity to think meta-cognitively about their learning. Research suggests that improved understanding of one's own learning is a critical strategy that can lead to improvements in learning.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	Students are not provided with any opportunity to engage in self-assessment of their work or thinking.	1	The teacher asks students to assess their own learning.	1	Same as 8B1	1	Same as 8B1
2	OR Students are asked to mark their own work for a summative grade.	2	The self-assessment task does not appear to be meaningful to most students (students do not take the task seriously or perceive value in the task).	2	The self-assessment task appears to be meaningful to most students.	2	The self-assessment task appears to be meaningful to all students.
		3	The self-assessment task lacks structure and does not support students (e.g. students do not understand the task, the task has not been modelled for students, students have not been provided with examples).	3	The self-assessment task is structured in a way (e.g., modelled for students, exemplars provided) that supports some students to complete an honest self- assessment but the support may not be adequate for all students.	3	The self-assessment task is structured in a way (e.g., modelled for students, exemplars provided) that supports all students to complete an honest self- assessment.
		4	Most students struggle to complete an honest self-assessment. The self-assessment does not have an impact on the quality of student work or instruction.	4	The self-assessment has a limited impact on the quality of student work or instruction.	4	The output of the self- assessment provides evidence to <ul style="list-style-type: none"> <li>i. The student by helping the student identify ways to improve their work</li> <li>OR</li> <li>ii. The teacher by providing evidence about student perceptions of their learning in a way that can be used to direct next instructional steps.</li> </ul>

**9. Collaboration:** A classroom culture in which teachers and students are partners in learning should be established. Research suggests that classrooms that promote thinking and learning, student autonomy, and students as learning resources for one another are more successful in encouraging lifelong learners.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	The classroom climate is characterised by an overall perception that the teacher is “in charge”.	1	The classroom climate is characterised for the most part by an overall perception that the teacher is “in charge”.	1	The classroom climate is characterised for the most part by an overall perception that the teacher and students are supporters of learning.	1	The classroom climate is characterised by an overall, consistent perception that the teacher and students are supporters of learning.
2	Student-to-student collaboration is not evident.	2	Limited student-to- student collaboration is evident.	2	Some student-to-student collaboration is evident.	2	Student-to-student collaboration is evident.
3	Student participation is limited to when the teacher asks a question, and the teacher does not capitalise on student responses or student questions to deepen learning.	3	Student participation is limited to when the teacher asks a question, and the teacher rarely capitalises on student responses or student questions to deepen learning.	3	Student participation is encouraged, and the teacher often capitalises on student responses or student questions to deepen learning.	3	Student participation is spontaneous (while respectful), and the teacher often capitalises on student responses or student questions to deepen learning.
4	Multiple viewpoints or approaches are not sought.	4	Multiple viewpoints or approaches are rarely sought.	4	Multiple viewpoints or approaches are occasionally sought.	4	Multiple viewpoints or approaches are consistently sought.
5	The teacher does not promote an attitude of “we can all learn”.	5	The teacher does not promote an attitude of “we can all learn” or is not convincing.	5	For the most part, the teacher promotes an attitude of “we can all learn”.	5	The teacher consistently promotes an attitude of “we can all learn”.



**10. Use of evidence to inform instruction:** Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes. This dimension focuses on the teacher use of evidence to adjust instruction across the lesson(s) as a whole.

A. Beginning		B. Developing		C. Progressing		D. Extending	
1	There is little or no attempt by the teacher to collect evidence of student learning in the lesson that is connected to the learning goals or criteria for success.	1	There is some evidence that the teacher collects evidence of student learning that is weakly connected to the learning goals or criteria for success.	1	The teacher uses multiple ways that are connected to the learning goals or criteria for success to collect evidence of student learning throughout the lesson systematically.	1	The teacher skillfully uses multiple ways that are connected to the learning goals or criteria for success to collect evidence of student learning throughout the lesson systematically.
	OR	2	The teacher does not analyse the evidence to identify patterns of understanding/ misunderstanding or make inferences about student strengths and weaknesses.	2	There is some evidence that the teacher is analysing the evidence to identify patterns of understanding/ misunderstanding or make inferences about student strengths and weaknesses.	2	There are multiple sources of evidence that indicate the teacher is analysing the evidence to identify patterns of understanding/ misunderstanding and to make inferences about student strengths and weaknesses.
2	The collection of evidence is so minimal or inconsistent that there is no way for the teacher to gain insight into student learning.						
3	The teacher does not have evidence of student learning to analyse.	3	The information is not used to shape instructional decisions.	3	The information identified patterns, and inferences are not used to shape instructional decisions.	3	The information identified patterns, and inferences are used in powerful ways to shape instructional decisions and advance student learning.
4	The teacher has no basis for modifying instructional plans.		(Observable evidence for this level is characterised by “lost opportunities.”)				

*Note.* Adapted with permission from Council of Chief state School Officers. (2013). Using the formative Assessment Rubrics, reflection and observation tools to support professional reflection on practice. Washington, DC: Wylie and Lyon. Copyright 2013 by CCSSO.

To search the CCSSO reference from the reference list use Wylie and Lyon as authors

## Appendix I: Letter to Ministry of Education and Human Resources, Tertiary Education and Scientific Research.

XXX  
MITD House (3rd Floor),  
Pont Fer, Phoenix, Mauritius

Sir,

### **RE: PERMISSION TO CONDUCT RESEARCH STUDY**

I am a lecturer at the Mauritius Institute of Education: Department of Curriculum Studies and Evaluation, and currently on study leave for my doctoral studies at the University of Waikato, New Zealand. I am an awardee of the New Zealand Commonwealth Scholarship and Fellowship Plan 2015, approved by the Ministry of Education and Human Resources, Tertiary Education and Scientific Research. My research interest is about assessment for learning in Design and Technology (D&T) in Mauritius secondary schools. I am seeking your approval to approach D&T teachers and Form 3 students from fifteen state secondary schools of three zones, to invite them to participate in my research study, which has been approved by the University of Waikato Faculty of Education ethics committee.

My doctoral research study will benefit all those involved with assessment for learning (e.g., teachers, lecturers and curriculum designers) as its purpose is to (1) explore the effectiveness of assessment for learning (AfL) practices of D&T teachers and (2) investigate students' perceptions of AfL.

This research study consists of four stages (research time plan is included). In the first stage, teachers will be requested to fill a questionnaire. The purpose of the questionnaire is to gain background information on D&T teachers. Permission will be sought from the respective school principals and D&T teachers. In the second stage, teachers will be invited to participate in a group interview. Fifteen group interviews (one per school) will be organised and each interview (40 minutes) will take place in the teachers' respective schools. The third stage will consist of two phases: the teacher and student phase. In the teacher phase, three teachers teaching Form 3 classes of different schools will be selected for observation. The researcher will be observing each teacher assessing one topic for a period of around five weeks. Secondary data such as of teachers' lessons, activities, and feedback provided to students (copybooks and scripts) will also be collected through photographs and photocopies. After each lesson, an interview (follow up conversations to clarify some ideas) of 10 minutes will be done with the three teachers concerned. In the student phase, five students from each observed classroom will participate in a group interview (30 minutes). Approval will be first sought from both parents and the students. Agreement will also be gained from respective school principals.

In the fourth stage, the researcher shall collect secondary data from two departments of the Ministry of Education:

[REDACTED]

to better understand teachers' assessment practices.

The findings of this study will be presented as part of my doctoral thesis, at seminars and conferences, and published in research journals for other stakeholders to learn from this research.

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms.

- When selected data from transcribed material will be used to support the summary of themes, pseudonyms will again be used to prevent identification.
- Group interviews audio recorded sessions will be transcribed verbatim and only those involved in the interview will have the opportunity to read the transcribed notes of their respective audio recording.
- Participation in this research is voluntary, participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them.
- Permission will be taken from respective school principals.
- Consent will be sought from all students and their parents before the start of data collection.
- Consent will also be sought from all teachers concerned.
- I am committed to take every possible step to prevent harm to my research participants involved in the research.
- While every effort will be made to ensure confidentiality, this cannot be guaranteed.
- The transcribed notes, audio recordings, digital pictures and observation data will all be saved in my password protected personal computer. The completed questionnaires and secondary data (lesson plans and activities data) will be locked in my personal cabinet.
- An electronic copy of the thesis will become widely available, as the University of Waikato requires that a digital copy of Doctoral theses be lodged permanently in the University's digital repository: Research Commons.
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party.
- The data collected from participants will be destroyed after five years.

If you would like to know more before taking any decision, please feel free to contact me ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx). I will happily elaborate on the research study and/or discuss any concern(s).

If there is need you may contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education. You can email her at [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) or call her on xx.

If there is a need, you may like to contact my chief supervisor, Prof. John Williams at the Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. You can email him at [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) or call him on xx.

The list of schools where data will be collected has been attached.

I look forward to hearing from you.

Thanking you.

Yours faithfully,

Chandan Boodhoo  
(E-mail: [cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz))

## Appendix J: Access by Ministry of Education



REPUBLIC OF MAURITIUS  
**MINISTRY OF EDUCATION AND HUMAN RESOURCES, TERTIARY  
EDUCATION AND SCIENTIFIC RESEARCH**

---

Our Ref: ME/305/3 T8

Date: 12 January 2016

Mr Chandan Boodhoo  
5D, Volcy de la Faye Street  
Beau Bassin

Dear Sir,

**Subject: Permission to Conduct Research Study**

Please refer to your letter [REDACTED] connection with the above subject.

2. I am pleased to inform you that approval has been granted for you to carry out your research in 15 State Secondary Schools as requested in the letter under reference.
3. The above is, however, subject to the following:
  - No classes will be disrupted while the survey is being carried out
  - Participation will be strictly voluntary and at the discretion of the Educators concerned
  - A report on the outcomes of the study will be submitted to this Ministry within one month after its completion.
4. You are kindly requested to liaise with the Rectors concerned prior to conducting your survey.

Yours faithfully,



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MITD House, Phoenix 73544 - MAURITIUS  
Tel. No: 601 3458 Fax No: (230) 697 5305  
E-mail: moe-secedu@mail.gov.mu

## Appendix K: Letter to Principals

Dear Sir/Madam,

### **RE: PERMISSION TO CONDUCT RESEARCH STUDY**

I am a lecturer at the Mauritius Institute of Education: Department of Curriculum Studies and Evaluation, and currently on study leave for my doctoral studies at the University of Waikato, New Zealand. My research interest is about assessment for learning in Design and Technology (D&T) in Mauritius secondary schools. I have already received the permission from the Ministry of Education and Human Resources, Tertiary Education and Scientific Research (letter attached). I am now seeking your approval to approach D&T teachers and Form 3 students of your school to invite them to participate in my research study.

My doctoral research study will benefit all those involved with assessment for learning (e.g., teachers, lecturers and curriculum designers) as its purpose is to (1) explore the effectiveness of assessment for learning (AfL) practices of D&T teachers and (2) investigate students' perceptions of AfL.

This research study consists of three stages (a time plan is also included). In the first stage, teachers will be requested to fill a questionnaire. The purpose of the questionnaire is to gain background information on D&T teachers. In the second stage, teachers will be requested to participate in a group interview. Fifteen group interviews (one per school) will be organised and each interview (40 minutes) will take place in the teachers' respective schools. The third stage will consist of two phases: the teacher and student phase. In the teacher phase, three teachers teaching Form 3 classes of different schools will be selected for observation. The researcher will be observing each teacher assessing one topic for a period of around five weeks. Secondary data such as of teachers' lessons, activities, and feedback provided to students (copybooks and scripts) will also be collected through photographs and photocopies. After each lesson, an interview (follow up conversations to clarify some ideas) of 10 minutes will be done with the three teachers concerned. In the student phase, five students from each observed classroom will participate in a group interview (30 minutes). Approval will be first sought from both parents and the students, and agreement will be gained from respective school principals.

The findings of this study will be presented as part of my doctoral thesis, at seminars and conferences, and published in research journals for other stakeholders to learn from this research.

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms.
- When selected data from transcribed material will be used to support the summary of themes, pseudonyms will again be used to prevent identification.
- Group interviews audio recorded sessions will be transcribed verbatim and only those involved in the interview will have the opportunity to read the transcribed notes of their respective audio recording.
- Participation in this research is voluntary, participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them.
- Consent will be sought from all students and their parents before the start of data collection.
- Consent will also be sought from all teachers concerned.

- I am committed to take every possible step to prevent harm to my research participants involved in the research. While every effort will be made to ensure confidentiality, this cannot be guaranteed.
- The transcribed notes, audio recordings, digital pictures and observation data will all be saved in my password protected personal computer. The completed questionnaires and secondary data (lesson plans and activities data) will be locked in my personal cabinet.
- An electronic copy of the thesis will become widely available, as the University of Waikato requires that a digital copy of Doctoral theses be lodged permanently in the University's digital repository: Research Commons.
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party.
- The data collected from participants will be destroyed after five years.

If you would like to know more before taking any decision, please feel free to contact me ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx). I will happily elaborate on the research study and/or discuss any concern(s).

If there is need you may contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education. You can email her at [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) or call her on xx.

If there is a need, you may like to contact my chief supervisor, Prof. John Williams at the Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. You can email him at [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) or call him on xx.

I look forward to hearing from you.

Thanking you.

Yours faithfully,

Chandan Boodhoo  
E-mail: [cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz)

## Principal's Consent form

Researcher: Mr Chandan Boodhoo

Doctoral study: *Assessment for learning in Design and Technology: A multi-case study in Mauritius secondary schools.*

By allowing this research to be conducted in my school, I am aware that:

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms;
- Only participants involved in the group interview will be allowed to review and approve the transcribed notes which will be done as a group and not individually;
- Participation in this research is voluntary, and participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them;
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party;
- The data collected from participants will be destroyed after five years;
- I can ask questions regarding the research study at any time;
- I can contact the researcher ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx) for additional information or to discuss any concern(s);
- I can contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education to get further clarification about the research (email [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) and phone xx);
- I can contact the researcher's chief supervisor, Prof. John Williams to get further clarification about the research (Address: Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand; email: [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) and phone xx).

I have read the guidelines and have no objection for D&T teachers and Form 3 students to participate in this research: *Assessment for learning in Design and Technology in Mauritius secondary schools.*

Name: ..... School seal

School: .....

Signature: ..... Date: ...../ 2016

## Appendix L: Letter to Teachers

Dear teacher,

### **RE: Teacher's consent**

I am a lecturer at the Mauritius Institute of Education: Department of Curriculum Studies and Evaluation, and currently on study leave for my doctoral studies at the University of Waikato, New Zealand. My research interest is about assessment for learning in Design and Technology (D&T) in Mauritius secondary schools. I am inviting you to participate in this research, for me to better understand how effectively D&T teachers are carrying out their practice of assessment for learning. My doctoral research study will benefit all those involved with assessment for learning (e.g., teachers, lecturers and curriculum designers) as its purpose is to (1) explore the effectiveness of assessment for learning (AfL) practices of D&T teachers and (2) investigate students' perceptions of AfL.

Data gathering for teachers will take place in three stages (1. questionnaire; 2. Teacher interview; 3. Teacher observation and interview- only three teachers will be selected). Stage one is the filling of a questionnaire which will take 20 to 30 minutes to complete. The purpose of the questionnaire is to understand how D&T teachers conduct assessment for learning.

Stage two is a group interview involving only D&T teachers. I shall contact all D&T teachers of your department to decide when the group interview can be carried out. The group interview will be audio recorded and transcribed verbatim. Teachers involved in the interview will have the opportunity to read the transcribed notes of their respective audio recording to ensure the accuracy of the transcription. Individual contributors to the group interview will not be permitted to review the transcript; however, the group as a whole may review the transcript.

In the last stage, three teachers, teaching Form 3 classes, of different schools will be selected for observation (one topic for a period of about 20 teaching periods). The classroom observation will be audio recorded to capture questions, discussions, and responses of both the teacher and students. Photographs/photocopies of your lessons, activities, feedback provided to students will also be collected. After each lesson, an interview (follow up conversations to clarify some ideas) of 10 minutes will be done with the respective teacher concerning assessment activities and decisions that were taken. The observations and interviews will be audio recorded.

The findings will be presented as part of my doctoral thesis, at seminars and conferences, and published in research journals for other stakeholders to learn from this research.

- The research findings will thus present broad themes only, and the identities of teachers and school will be protected by using pseudonyms. When selected data from transcribed material will be used to support the summary of themes, I will again use pseudonyms to prevent identification.
- I am committed to take every possible step to prevent harm to my research participants involved in this research. While every effort will be made to ensure confidentiality, this cannot be guaranteed.
- An electronic copy of the thesis will become widely available, as the University of Waikato requires that a digital copy of Doctoral theses be lodged permanently in the University's digital repository: Research Commons.



- The transcribed notes (group interview audio recorded sessions), audio recordings, digital pictures and observation data will all be saved in my password protected personal computer. The completed questionnaires and secondary data (lesson plans and activities data) will be locked in my personal cabinet.
- Participation in this research is voluntary, participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them.
- Only my supervisors and I will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The data collected from participants will be destroyed after five years.
- The researcher intends to carry out a workshop with the teacher participants at the end of the study. This workshop will be an opportunity to share the findings of the research study as well as a platform for the teachers to reflect on their assessment practices. The researcher also plans to have a set of guidelines for AfL practices in D&T which is expected to improve students' learning. In the long run, the researcher intends to conduct additional research in the area of AfL that is expected to enhance students' learning at all levels.

If you would like to know more before taking any decision, please feel free to contact me ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx). I will happily elaborate on the research study and/or discuss any concern(s).

If there is need you may contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education. You can email her at [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) or call her on xx.

If there is a need, you may like to contact my chief supervisor, Prof. John Williams at the Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. You can email him at [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) or call him on xx.

Thanking you.

Yours faithfully,

Chandan Boodhoo

E-mail: [cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz)

## Teacher Consent form

Researcher: Mr Chandan Boodhoo

Doctoral study: *Assessment for learning in Design and Technology: A multi-case study in Mauritius secondary schools.*

By agreeing to participate in this research, I am aware that:

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms;
- Only participants involved in the group interview will be allowed to review and approve the transcribed notes which will be done as a group and not individually;
- Participation in this research is voluntary, and participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them;
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party;
- The data collected from participants will be destroyed after five years;
- I can ask questions regarding the research study at any time;
- I can contact the researcher ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx) for additional information or to discuss any concern(s);
- I can contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education to get further clarification about the research (email [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) and phone xx);
- I can contact the researcher's chief supervisor, Prof. John Williams to get further clarification about the research (Address: Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand; email: [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) and phone xx).

I have read the guidelines and have no objection participating in this research study: *Assessment for learning in Design and Technology in Mauritius secondary schools.*

Name: .....

School: .....

Signature: .....

Date: ..... / 2016

## **Appendix M: Letter Head of Department at Mayfield**

10<sup>th</sup> Feb 2016

### **MEMO**

Dear Sir/Madam,

#### **To whom it may concern**

This is to inform you that, for my doctoral research study, I am considering Design and Communication as a component of Design and Technology. I intend exploring how assessment for learning is carried out in any of these three focused areas: product design, practical technology and graphics products. Thus, if only Design and Communication is offered at any particular school, it does not pose any problem to my study.

Thanking you.

Yours faithfully,

Chandan Boodhoo

## Appendix N: Available Teachers for Interviews and Teacher Selection for Observations

	Pseudonym		Permanent (P) / contract (C)	Teach Form 3	Agreeable for Observation	Supportive		Available for selection	Years of teaching exp.	Selected teachers	Form Three class	
	School	Teacher				Principal	Teacher				Days	Time
1	Petersfield	Robb	P	Yes	No (Pilot int.)	supportive			21-25			
2	Banfield	Arya	P	Yes	No	supportive			16-20			
		Mark	P	Yes			Yes	5-10				
		Loras	C	Yes				<5				
3	Canfield	Tom	P	Yes		supportive	Yes	5-10				
		Sansa	C	Yes				<5				
4	Garfield	Gregor	P	Yes		supportive	Yes	16-20				
		Catelyn	C	Yes				<5				
5	Rayfield	Jon	P	Yes		supportive	Yes	21-25				
		Daario	P	Yes			Yes	11-15				
		Reed	P	Yes			Yes	11-15	Middle exp.	Mon; Wed	8:00-9:30; 8:00-9:30	
6	Fairfield	Grey	P	No		unsupportive		16-20				
		Khal	P	Yes				5-10				
		Jorah	P	Yes				11-15				
7	Sheffield	Joffrey	P	Yes	No	supportive		31-35				
		Ramsey	P	Yes	No			11-15				
		Sandor	P	No				5-10				
8	Mansfield	Bronn	P	Yes		supportive	Yes	16-20	Most experience	Tue; Wed	12:00-13:15; 13:15-14:30	
		Rickon	P	Yes			Yes	5-10				
		Eddard	C	Yes				5-10				
9	Greenfield	Davos	P	Yes		unsupportive		5-10				
		Bran	C	Yes				<5				
10	Coldfield	Jaime	P	No		supportive		16-20				
		Samuelli	P	Yes			unsupportive	11-15				
11	Redfield	Stannis	P	No		unsupportive		36-40				
		Tyrion	P	Yes	No			26-30				
		Robert	P	Yes	(Pilot Obs.)			5-10				
12	Mayfield	Theon	P	Yes		supportive	unsupportive	36-40				
		Benjen	P	No				5-10				
		Renly	P	Yes			Yes	5-10	least experience	Tue; Thu	13:00-14:30; 8:00-9:30	

*Note.* Only permanent teachers were considered appropriate for classroom observations

## Appendix O: Letter to Form 3 Students

Dear Student,

### **RE: Student's consent**

I am a lecturer at the Mauritius Institute of Education: Department of Curriculum Studies and Evaluation, and currently on study leave for my doctoral studies at the University of Waikato, New Zealand. My research interest is about assessment for learning in Design and Technology in Mauritius secondary schools.

I am inviting you to participate in this research, for me to understand students' perception of assessment in Design and Technology.

The study will benefit all those involved with assessment for learning (e.g., teachers, lecturers, curriculum designers, parents, and students) as its purpose is to:

1. Explore the effectiveness of assessment for learning (AfL) practices of Design and Technology (D&T) teachers and
2. Investigate students' perceptions of AfL.

#### **A. Teacher observation**

- i. During the teacher observation, I might take photographs of your copybooks, or scripts, to record teachers' feedback.

#### **B. Student group interview**

- i. The data gathering (group interview) will take place at the end of the classroom observation (after 5 weeks classroom observation)
- ii. The interview will be for a duration of 30 minutes.
- iii. The interview will involve five selected students from the class.
- iv. The interview will be audio recorded.
- v. Students will have the opportunity to read the transcribed notes to ensure accuracy in transcription.
- vi. Individual participants will not be permitted to review the transcript; however, the group as a whole may review the transcript.

#### **C. How research will be used and ethical considerations**

- i. The findings will be presented as part of my doctoral thesis, at seminars presentations and conferences, and published in research journals for other stakeholders to learn from this research. The data collected from participants will be destroyed after five years.
- ii. An electronic copy of the thesis will become widely available, as the University of Waikato requires that a digital copy of Doctoral theses be lodged permanently in the University's digital repository: Research Commons.
- iii. Made-up names (Pseudonyms) will be used to prevent identification of individual and to prevent potential harm to research participants (students). While every effort will be made to ensure confidentiality, this cannot be guaranteed.
- iv. Only my supervisors and I will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason.
- v. The transcribed notes, audio recordings, digital pictures and observation data will all be saved in my password protected personal computer. The completed questionnaires and secondary data (lesson plans and activities data) will be locked in my personal cabinet.

- vi. Participation in this research is voluntary, participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them.

If you would like to know more before taking any decision, please feel free to contact me ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx). I will happily elaborate on the research study and/or discuss any concern(s).

If there is need you may contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education. You can email her at [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) or call her on xx.

If there is a need, you may like to contact my chief supervisor, Prof. John Williams at the Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. You can email him at [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) or call him on xx.

Thanking you.

Yours faithfully,

Chandan Boodhoo  
E-mail: [cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz)

## Student Consent form

Researcher: Mr Chandan Boodhoo

Doctoral study: *Assessment for learning in Design and Technology: A multi-case study in Mauritius secondary schools.*

By agreeing to participate in this research, I am aware that:

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms;
- Only participants involved in the interview will be allowed to review and approve the transcribed notes which will be done as a group and not individually;
- Participation in this research is voluntary, and participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them;
- The researcher might take photographs of students' work but not of participants;
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party;
- The data collected from participants will be destroyed after five years;
- I can ask questions regarding the research study at any time;
- I can contact the researcher ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx) for additional information or to discuss any concern(s);
- I can contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education to get further clarification about the research (email [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) and phone xx);
- I can contact the researcher's chief supervisor, Prof. John Williams to get further clarification about the research (Address: Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand; email: [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) and phone xx).

I have read the guidelines and have no objection participating in this research study: *Assessment for learning in Design and Technology in Mauritius secondary schools.*

Student's Name: .....

School: .....

Signature: .....

Date: ...../ 2016

**Kindly return the signed form to your Design and Technology teacher.**

## Appendix P: Letter to Parents

Dear Parents,

### **RE: Parents' consent**

I am a lecturer at the Mauritius Institute of Education: Department of Curriculum Studies and Evaluation, and currently on study leave for my doctoral studies at the University of Waikato, New Zealand. My research interest is about assessment for learning in Design and Technology (D&T) in Mauritius secondary schools. I am seeking your approval to approach your ward, to invite him/her to participate in my research study, to understand students' perception of assessment in Design and Technology.

The study will benefit all those involved with assessment for learning (e.g., teachers, lecturers, curriculum designers, parents, and students) as its purpose is to (1) explore the effectiveness of assessment for learning (AfL) practices of D&T teachers and (2) investigate students' perceptions of AfL.

During the observation (5 weeks) of the D&T teachers' assessment practices, the researcher might take photographs of selected students' copybooks, or scripts (no photograph of the student(s) will be taken) to understand teachers' assessment practices better. Selected students, five per class, will participate in a group interview, which will last for a period of 30 minutes and be audio recorded. The audio recording will be transcribed verbatim. Only students involved in the interview will have the opportunity to read the transcribed notes of their respective audio recording to ensure the accuracy of the transcription. Individual contributors to the group interview will not be permitted to review the transcript; however, the group as a whole may review the transcript. Students will be informed in advance for the interview and permission will be gained in advance from the respective school principal.

The findings will be presented as part of my doctoral thesis, at seminars presentations and conferences, and published in research journals for other stakeholders to learn from this research.

- The research findings will present broad themes only and the identities of the school, teacher and students will be protected by using pseudonyms. When selected data from transcribed material will be used to support the summary of themes, I will again use pseudonyms to prevent identification.
- I am committed to take every possible step to prevent harm to my research participants involved in this research. While every effort will be made to ensure confidentiality, this cannot be guaranteed.
- An electronic copy of the thesis will become widely available, as the University of Waikato requires that a digital copy of Doctoral theses be lodged permanently in the University's digital repository: Research Commons.
- The transcribed notes (interview audio recorded sessions), audio recordings, digital pictures and observation data will all be saved in my password protected personal computer.
- Participation in this research is voluntary, participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them.
- Only my supervisors and I will have access to raw data and information of this research study, and will not be shared with any other external parties for any reason.
- The data collected from participants will be destroyed after five years.



If you would like to know more before taking any decision, please feel free to contact me ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx). I will happily elaborate on the research study and/or discuss any concern(s).

If there is need you may contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education. You can email her at [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) or call her on xx.

If there is a need, you may like to contact my chief supervisor, Prof. John Williams at the Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. You can email him at [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) or call him at xx.

Thanking you.

Yours faithfully,

Chandan Boodhoo

E-mail: [cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz)

## Parents' Consent form

Researcher: Mr Chandan Boodhoo

Doctoral study: *Assessment for learning in Design and Technology: A multi-case study in Mauritius secondary schools.*

By agreeing for my ward to participate in this research, I am aware that:

- The findings will present broad themes only, and the identities of schools, teachers, and students will be protected by using pseudonyms;
- Only participants involved in the group interview will be allowed to review and approve the transcribed notes which will be done as a group and not individually;
- Participation in this research is voluntary, and participants have the right not to participate and can withdraw from the research study at any time. With regards to data, participants have the right to withdraw their data up to a point when the transcribed and observation data have been approved by them;
- The researcher might take photographs of students' work but not of participants;
- Only the researcher and his supervisors will have access to raw data and information of this research study, which will not be shared with any other external parties for any reason. The researcher will not disclose any information with regards to the performance, planning, feedback, marking or viewpoints of the participants to any other party;
- The data collected from participants will be destroyed after five years;
- I can ask questions regarding the research study at any time;
- I can contact the researcher ([cb89@students.waikato.ac.nz](mailto:cb89@students.waikato.ac.nz) or xx) for additional information or to discuss any concern(s);
- I can contact Dr Hyleen Mariaye, Associate Professor at the Mauritius Institute of Education to get further clarification about the research (email [h.mariaye@mieonline.org](mailto:h.mariaye@mieonline.org) and phone xx);
- I can contact the researcher's chief supervisor, Prof. John Williams to get further clarification about the research (Address: Technology, Environment, Mathematics Science Education Research Centre, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand; email: [jwilliam@waikato.ac.nz](mailto:jwilliam@waikato.ac.nz) and phone xx).

I have read the guidelines and have no objection for my ward to participate in this research: *Assessment for learning in Design and Technology in Mauritius secondary schools.*

Name: .....

Signature: ..... Date: ...../ 2016

Ward's Name: .....

**Kindly return the signed form to your ward's Design and Technology teacher.**

## Appendix Q: Transcript Release Form

**Researcher:** Mr Chandan Boodhoo

**Doctoral study:** Assessment for learning in Design and Technology: A multi case study in Mauritius secondary schools

**Institution:** University of Waikato, New Zealand

**Faculty:** School of Education

### AUTHORITY FOR THE RELEASE OF TRANSCRIPTS

I confirm that I have had the opportunity to read and amend the transcript of the interview conducted with me.

I agree that the edited transcript and extracts from this may be used in reports and publications arising from the research.

Full Name: .....

School: .....

Interview Number: .....

Student/Teacher: .....

Signature: ..... Initial: .....

Date: .....

## Appendix R: Ethics Approval

Dean's Office  
Faculty of Education  
*Te Kura Toi Tangata*  
The University of Waikato  
Private Bag 3105  
Hamilton, New Zealand

Phone +64 7 838 4500  
[www.waikato.ac.nz](http://www.waikato.ac.nz)



THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

### MEMORANDUM

**To:** Chandan Boodhoo  
**cc:** Professor John Williams  
**From:** Dr Carl Mika  
Chairperson, Research Ethics Committee  
**Date:** 19 January 2016  
**Subject:** Supervised Postgraduate Research – Application for Ethical Approval (FEDU002/16)

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Thank you for submitting the revisions to your application for ethical approval for the research project:

Assessment for learning in Design and Technology:  
A multi case study in Mauritius secondary schools

I am pleased to advise that your application has received approval.

Please note that researchers are asked to consult with the Faculty's Research Ethics Committee in the first instance if any changes to the approved research design are proposed.

The Committee wishes you all the best with your research.

Dr Carl Mika  
Chairperson  
Research Ethics Committee

## Appendix S: Codes Used in the Study

Table 11. 1 Group and individual teacher interview codes

Interview	Date (2016)	Time	School (pseudonym)	Audio Recording Number	Teacher (pseudonym)	Code	Page number of transcript
1	2 Feb	10:20–10:35	Petersfield	P.001	Robb	I1.T1	1–6
2	12 Feb	9:40–10:10	Banfield	P.002	Arya	I2.T1	1–9
					Mark	I2.T2	
					Loras	I2.T3	
3	16 Feb	8:20–8:50	Canfield	P.004	Tom	I3.T1	1–6
					Sansa	I3.T2	
4	16 Feb	10:20–10:55	Garfield	P.005	Gregor	I4.T1	1–6
					Catelyn	I4.T2	
5	18 Feb	8:15–9:35	Rayfield	P.006	Jon	I5.T1	1–5
					Daario	I5.T2	
					Reed	I5.T3	
6	22 Feb	8:25–8:55	Fairfield	P.007 P.008 P.009	Grey	I6.T1	1–6
					Khal	I6.T2	
					Jorah	I6.T3	
7	23 Feb	11:15–11:55	Sheffield	P.011	Joffrey	I7.T1	1–9
					Ramsey	I7.T2	
					Sandor	I7.T3	
8	25 Feb	9:10–9:50	Mansfield	P.014	Bronn	I8.T1	1–9
					Rickon	I8.T2	
					Eddard	I8.T3	
9	29 Feb	11:55–12:25	Greenfield	P.015	Davos	I9.T1	1–8
					Bran	I9.T2	
10	15 Mar	10:45–11:05	Coldfield	P.021	Jaime	I10.T1	1–5
11		11:10–11:25		P.024 P.025	Samuelli	I11.T1	1–4
12	18 Mar	11:50–11:25	Redfield	P.030 P.031	Stannis	I12.T1	1–7
					Tyrion	I12.T2	
					Robert	I12.T3	
13	24 Mar	11:15–11:35	Mayfield	P.037	Theon	I13.T1	1–7
					Benjen	I13.T2	
					Renly	I13.T3	

*Note.* For example, I2.T1:6 refers to a citation from Interview 2 with Teacher 1 (Arya) and appearing on page 6 of the transcript.

P.001 refers to audio recording number 1 saved on my Panasonic recorder.

Table 11. 2 Teacher observation audio recording codes

Date (2016)	Time	School (pseudonym)	Lesson Observation	Teacher (pseudonym)	Audio Recording Number	Code
9 Feb	8:20–9:30	Redfield	1 (pilot)	Robert	I.17	O1.L1
22 Feb	9:40–11:00	Rayfield	1 (pilot)	Reed	I.20	O2.L1
24 Feb	8:20–9:30		2		P.012	O2.L2
2 Mar	8:25–9:30		3		P.016	O2.L3
9 Mar	8:45–9:30		4		P.019	O2.L4
16 Mar	8:20–9:30		5		P.027	O2.L5
21 Mar	8:20–9:30		6		P.032	O2.L6
23 Mar	8:20–9:30		7		P.035	O2.L7
30 Mar	8:45–9:30		8		P.038	O2.L8
18 Apr	8:55–9:30		9		P.040, P.041	O2.L9
25 Apr	8:50–9:30		10		I.26	O2.L10
9 May	8:20–9:30		11		I.27, I.28, I.29	O2.L11
23 Feb	13:30–14:30	Mansfield	1 (pilot)	Bronn	I.21	O3.L1
24 Feb	12:25–13:30		2		P.013	O3.L2
2 Mar	12:25–13:30		3		P.017	O3.L3
8 Mar	13:40–14:30		4		P.018	O3.L4
9 Mar	12:15–13:30		5		P.020	O3.L5
15 Mar	13:45–14:30		6		P.026	O3.L6
16 Mar	12:10–13:30		7		P.029	O3.L7
22 Mar	13:20–14:30		8		P.033	O3.L8
23 Mar	12:10–13:30		9		P.036	O3.L9
30 Mar	12:10–13:30		10 (test)		-	O3.L10
20 Apr	12:10–13:30		11		P.043	O3.L11
31 Mar	8:15–9:30	Mayfield	1 (pilot)	Renly	P.039	O4.L1
19 Apr	8:15–9:30		2		P.042	O4.L2
3 May	8:15–9:30		3		P.0010	O4.L3
5 May	8:15–9:30		4		P.0020	O4.L4
10 May	8:15–9:30		5		P.0030	O4.L5
12 May	8:15–9:30		6		P.0040	O4.L6
17 May	9:05–9:30		7		P.0050	O4.L7
24 May	8:15–9:30		8 (test)		P.0060	O4.L8
26 May	9:05–9:30		9 (feedback)		P.0080	O4.L9

*Note.* For example, O3.L1.3:02 refers to a citation obtained from Observations of Teacher 3 (Bronn) during Lesson 1 and retrieved from the audio recording at 3 minutes 2 seconds. P.012 refers to audio recording number 12 saved by my Panasonic recorder and I.17 refers to audio recording number 17 saved on my iPad recorder.

Table 11. 3 Secondary documents (photograph) codes

Date (2016)	School (pseudonym)	Lesson Observed	Teacher (pseudonym)	Code	Photo Number
22 Feb	Rayfield	1 (pilot)	Reed	SD.T2.L1.P	1
24 Feb		2		SD.T2.L2.P	1–4
2 Mar		3		SD.T2.L3.P	1–31
9 Mar		4		SD.T2.L4.P	1–33
16 Mar		5		SD.T2.L5.P	1–19
21 Mar		6		SD.T2.L6.P	1–12
23 Mar		7		SD.T2.L7.P	1–19
30 Mar		8		SD.T2.L8.P	1–11
18 Apr		9		SD.T2.L9.P	1–8
25 Apr		10		SD.T2.L10.P	1–8
9 May		11		SD.T2.L11.P	1–15
23 Feb	Mansfield	1 (pilot)	Bronn	SD.T3.L1.P	0
24 Feb		2		SD.T3.L2.P	1–2
2 Mar		3		SD.T3.L3.P	0
8 Mar		4		SD.T3.L4.P	0
9 Mar		5		SD.T3.L5.P	1–3
15 Mar		6		SD.T3.L6.P	1–6
16 Mar		7		SD.T3.L7.P	1–3
22 Mar		8		SD.T3.L8.P	1–17
23 Mar		9		SD.T3.L9.P	1–47
30 Mar		10 (test)		SD.T3.L10.P	1–2
20 Apr		11		SD.T3.L11.P	1–17
31 Mar	Mayfield	1 (pilot)	Renly	SD.T4.L1.P	1
19 Apr		2		SD.T4.L2.P	0
3 May		3		SD.T4.L3.P	1–12
5 May		4		SD.T4.L4.P	1–29
10 May		5		SD.T4.L5.P	1–12
12 May		6		SD.T4.L6.P	1–30
17 May		7		SD.T4.L7.P	1–26
24 May		8 (test)		SD.T4.L8.P	1–16
26 May		9		SD.T4.L9.P	1–33

*Note.* For example, SD.T3.L5.P1 refers to Secondary Data taken from Teacher 3 (Bronn) during Lesson 5 and was the Photo number 1.

Table 11. 4 Informal teacher interview codes

Date (2016)	School (pseudonym)	Informal interview	Teacher (pseudonym)	Code	Page number of transcript
9 Feb	Redfield	1	Robert	I.I.T1.L1.	1
22 Feb	Rayfield	1 (pilot)	Reed	I.I.T2.L1.	1
24 Feb		2		I.I.T2.L2.	1
2 Mar		3		I.I.T2.L3.	1–2
9 Mar		4 (Heats)		I.I.T2.L4.	1
16 Mar		5		I.I.T2.L5.	1
21 Mar		6		I.I.T2.L6.	1
23 Mar		7		I.I.T2.L7.	1
30 Mar		8		I.I.T2.L8.	1
18 Apr		9		I.I.T2.L9.	1–2
25 Apr		10		I.I.T2.L10.	1
9 May		11		I.I.T2.L11.	1–2
23 Feb	Mansfield	1 (pilot)	Bronn	I.I.T3.L1.	1
24 Feb		2		I.I.T3.L2.	1
2 Mar		3		I.I.T3.L3.	1
8 Mar		4		I.I.T3.L4.	1
9 Mar		5		I.I.T3.L5.	1
15 Mar		6		I.I.T3.L6.	1–2
16 Mar		7		I.I.T3.L7.	1
22 Mar		8		I.I.T3.L8.	1
23 Mar		9		I.I.T3.L9.	1
30 Mar		10 (test)		I.I.T3.L10.	1
20 Apr		11		I.I.T3.L11.	1–2
31 Mar	Mayfield	1 (pilot)	Renly	I.I.T4.L1.	1
19 Apr		2		I.I.T4.L2.	1
3 May		3		I.I.T4.L3.	1
5 May		4		I.I.T4.L4.	1
10 May		5		I.I.T4.L5.	1
12 May		6		I.I.T4.L6.	1–2
17 May		7 (assembly)		I.I.T4.L7.	1
24 May		8 (test)		I.I.T4.L8.	1
26 May		9 (assembly)		I.I.T4.L9.	1–2

*Note.* For example, I.I.T4.L1:3 refers to a citation obtained from Informal Interview from Teacher 4 (Renly), after Lesson 1 and retrieved from page 3 of the transcript.



Table 11. 5 Field note codes

Date (2016)	School (pseudonym)	Field notes	Teacher (pseudonym)	Code	Page number of transcript
9 Feb	Redfield	1	Robert	FN1.L1.	1–3
22 Feb	Rayfield	1 (pilot)	Reed	FN2.L1.	1–3
24 Feb		2		FN2.L2.	1–3
2 Mar		3		FN2.L3.	1–4
9 Mar		4 (Heats)		FN2.L4.	1–5
16 Mar		5		FN2.L5.	1–6
21 Mar		6		FN2.L6.	1–6
23 Mar		7		FN2.L7.	1–6
30 Mar		8		FN2.L8.	1–4
18 Apr		9		FN2.L9.	1–3
25 Apr		10		FN2.L10.	1–3
9 May		11		FN2.L11.	1–4
23 Feb	Mansfield	1 (pilot)	Bronn	FN3.L1.	1–3
24 Feb		2		FN3.L2.	1–3
2 Mar		3		FN3.L3.	1–5
8 Mar		4		FN3.L4.	1–5
9 Mar		5		FN3.L5.	1–5
15 Mar		6		FN3.L6.	1–4
16 Mar		7		FN3.L7.	1–7
22 Mar		8		FN3.L8.	1–6
23 Mar		9		FN3.L9.	1–3
30 Mar		10 (test)		FN3.L10.	1
20 Apr		11		FN3.L11.	1–3
31 Mar	Mayfield	1 (pilot)	Renly	FN4.L1.	1–3
19 Apr		2		FN4.L2.	1–7
3 May		3		FN4.L3.	1–4
5 May		4		FN4.L4.	1–8
10 May		5		FN4.L5.	1–3
12 May		6		FN4.L6.	1–7
17 May		7 (assembly)		FN4.L7.	1–2
24 May		8 (test)		FN4.L8.	1–3
26 May		9 (assembly)		FN4.L9.	1

*Note.* For example, FN3.L1:3 refers to a citation obtained from Field Note relating to observation of Teacher 3 (Bronn) during Lesson 1 and retrieved from page 3 of the transcript.

*Table 11. 6 Group student interview codes*

<b>Interview</b>	<b>Date (2016)</b>	<b>Time</b>	<b>School (pseudonym)</b>	<b>Audio Recording Number</b>	<b>Student</b>	<b>Code</b>	<b>Page number of transcript</b>
1	24 May	12:00–12:25	Rayfield	P.0070	Brian	I1.S1	1–10
					Dev	I1.S2	
					Anthony	I1.S3	
					Johnny	I1.S4	
					Daniel	I1.S5	
2	14 Jun	12:00–12:25	Mansfield	P.0100 P.0110	Paul	I2.S1	1–8
					Sam	I2.S2	
					Sheila	I2.S3	
					David	I2.S4	
					Albert	I2.S5	
					Jane	I2.S6	
3	3 Jun	10:00–10:17	Mayfield	P.0090	Mike	I3.S1	1–8
					Helena	I3.S2	
					Jack	I3.S3	
					Mary	I3.S4	
					Chris	I3.S5	

*Note.* For example, I1.S3:5 refers to a quote from Interview at School 1 (Rayfield) with Student 3 (Anthony) and appearing on page 5 of the transcript.

P.0070 refers to audio recording number 70 saved on my Panasonic recorder.